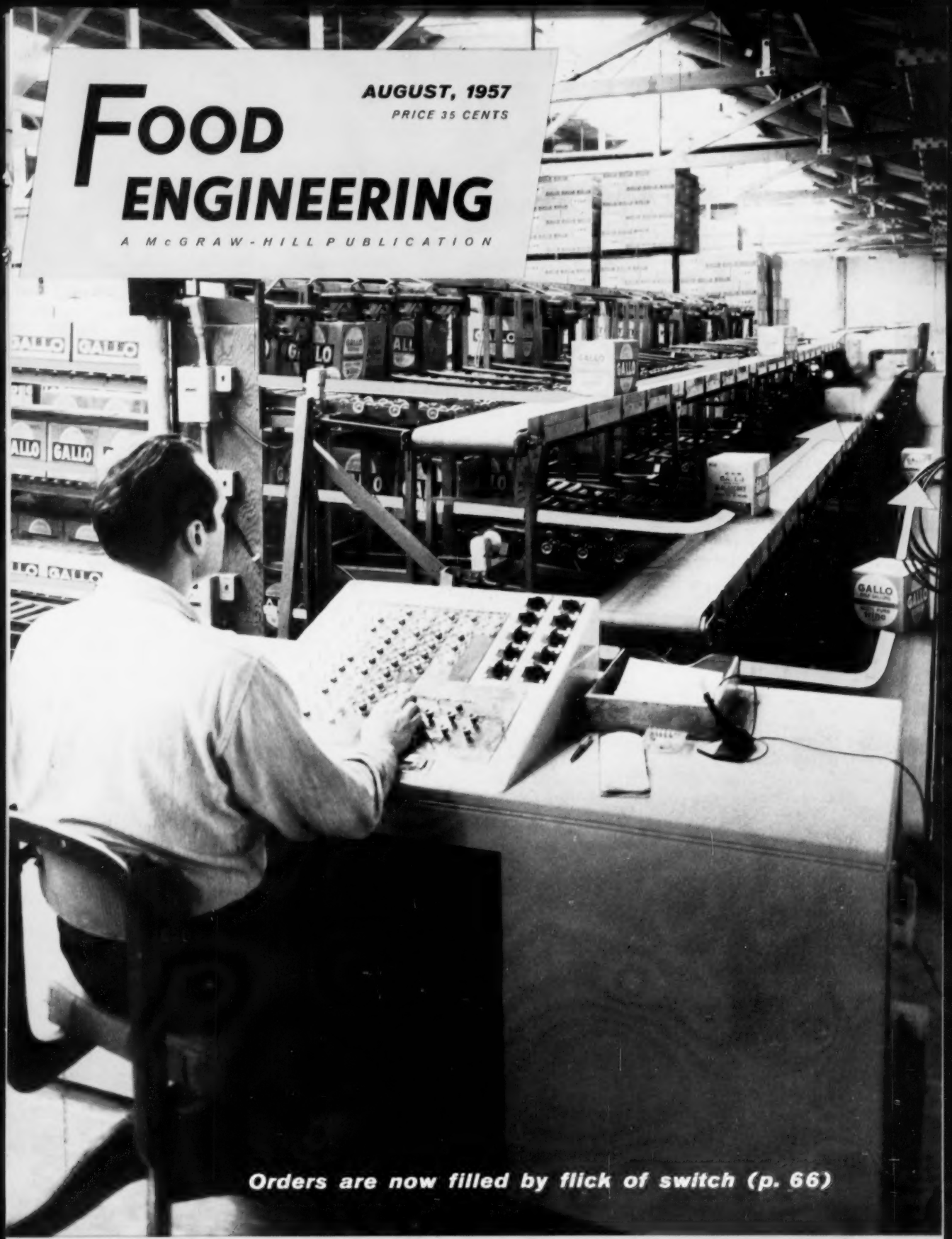
AUGUST, 1957
PRICE 35 CENTS

FOOD ENGINEERING

A McGRAW-HILL PUBLICATION



Orders are now filled by flick of switch (p. 66)

Why firms fail (p. 60) • Process-flow calculator (p. 102)

Barber-Coleman

Bendix-Westinghouse Rotochamber

Conoflow

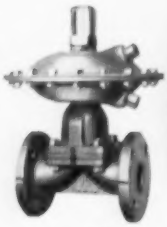
Fisher Governor

Foxboro Reversible Stabiflo

General Controls Hydramotor

GRINNELL-SAUNDERS DIAPHRAGM VALVES with famous name POWER OPERATORS

Grinnell Air Motor, Spring Loaded



Grinnell Air Motor, Double-Acting

Grinnell Piston

Hammel-Dahl Close-Coupled

Hammel-Dahl Preloaded

Kieley & Mueller

Mason-Neilan

Minneapolis-Honeywell

Philadelphia Gear Limitorque

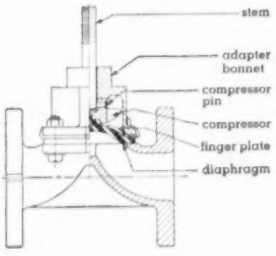
Taylor Motosteel

GRINNELL-SAUNDERS Diaphragm Valves are easily equipped for power operation — by combining any of numerous power operators, a sliding stem bonnet assembly, and a valve body. The sliding stem bonnet can be modified to accommodate any make of power operator, pneumatic or electric.

Grinnell-Saunders Diaphragm Valves are unsurpassed for handling materials as diversified as corrosive fluids, gases, beverages, foods . . . in lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are costly factors.

The operating principal of the Grinnell-Saunders Diaphragm Valve is simple. The resilient, flexible diaphragm is lifted high when the compressor is raised and pressed tight against the body weir when the compressor is lowered.

Grinnell valves are available with body, lining, and diaphragm materials to meet different service conditions. For further information, write Grinnell Company, Inc., 295 West Exchange St., Providence, R. I.



This sliding stem bonnet is specially designed for power operation. The power operator is attached to the adapter bonnet and to the threaded end of its free-sliding stem. Thus, the operating force is applied *directly*. The stem, in turn, is directly connected to the compressor which opens and closes the valve when power is applied. This sliding stem bonnet is interchangeable with other bonnet designs.

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WHENEVER PIPING IS INVOLVED

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

← For more data, circle this page number on card at back

FOOD ENGINEERING

AUGUST 1957

VOL 29 NO. 8

SPECIAL **AUTOMATED ORDER-MAKEUP SYSTEM CUTS HANDLING COSTS** 66
Single "console man" controls fast multi-conveyor assembling of cases (see cover photo).

Trends & Forecasts ..... 7 *Developments to Watch* 17

MANAGEMENT **5 Factors That Win Top Lab-Team Performance** 55
Says expert: Spot men with potential, then accent comradeship, facilities, policies, and pay.

Food Manufacturing Failures—And What Causes Them 60
Creditors lost over $10 million in '56. . . . Here are the danger signals you should watch for.

Pioneers as "Independent" in Liquid-Sweetener Marketing 70
Coast man profits with promising new form of business backed by advanced methods.

Ole Sage Episode: What's Your Best Bet in Pension Plans? 34
Question hinges on giving workers vested interests in funds—and, if so, when and how.

PACKAGING **Vac-Pack Speed Boosted by New Rotary Packager** 94
And double economy is won—output up 50%, wrapper consumption down 50%.

Creating the Package: Crystal Clear Shrinkable Roll-Film's Debut 20
Protection boosted using new polymer. (See also New Packages & Products, p. 24)

INSTRUMENTS **New Line Instrument Gages Brix at 480 Times/Second** 64
Accuracy in checking orange concentrate is stepped up by new optical-electronic unit.

PROCESSING **Makes Better Blends With Advanced Mixer** 73
Unit solves vanilla-sugar problems. . . . Opens way to many new product formulations.

New Extraction Process Improves Paprika Color 82
Applied to fresh peppers, technique removes sugars and gums prior to solvent treatment.

MAINTENANCE **Simple Ceramic-Spray Technique Cuts Wall-Surfacing Costs** 58
Resistant, sanitary finish goes on in record time. Highly attractive, it's readily kept clean.

ENGINEERING **12 Advanced Units for Plant Engineering** 88
Latest air conditioning, heating, cleaning systems draw top interest at show.

New Multiple-Drive System Sharpens Control of Your Product Flow . . . 90
In bakery, it synchronizes 825-ft. conveyor system for precision cooling. Other uses seen.

Why Not Try Titanium? 97
Light, strong, easily cleaned metal affords A-1 corrosion resistance in food equipment.

This Foldout Chart Speedily Answers Process-Conveyor Problems 102
Worked with pencil and ruler, it pinpoints output factors, aids design of flow systems.

INGREDIENTS **Anti-Caking Agents—How Evaluated, How Applied** 85
Here are simple tests to gage their efficiencies. Care in blending is key to good results.

MATERIALS HANDLING **Teams Machines & Chutes to Save Labor, Space** 63
Set up automatically, beer cartons whisk vertically through plant in tube-formed conveyors.

Efficient Waste-Disposal System—Totes Finished Goods, Too 74
All gather-and-haul tasks handled by variety of versatile containers—with many savings.

QUALITY CONTROL **Faster Insect-Egg Spotting—The Enzyme Way** 100
Pectic agent gives accurate check on tomato products in simple filtration method.

TRANSPORTATION **Pneumatic Sugar Delivery—For More Users** 59
Cost-saving bulk trailers are now rolling in Eastern states. Can serve any size plant.

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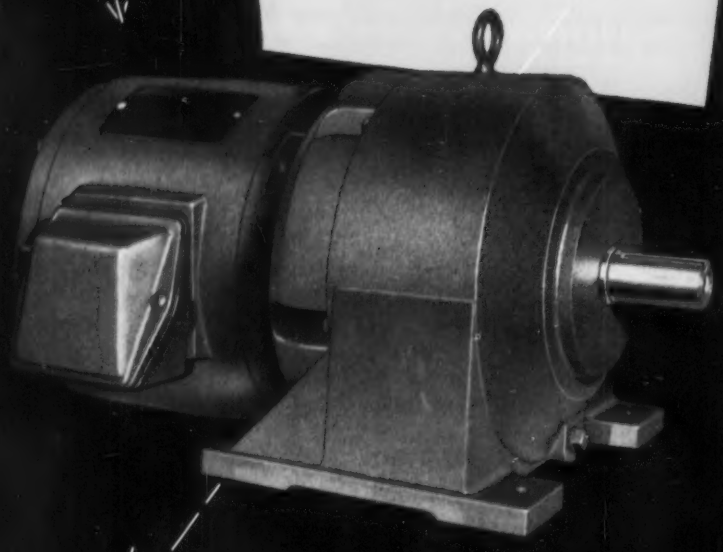
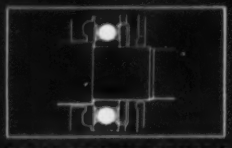
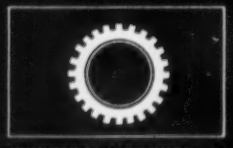
Don't overlook what you can't see



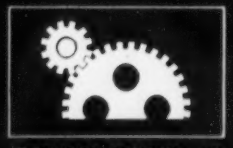
You can't always see what makes a gearmotor outstanding. It's the attention paid to small design details that makes the difference. Here are a few of the details that make the new Reliance Gearmotor stand above the rest.



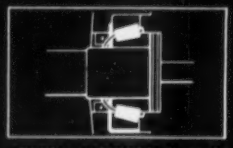
FOOLPROOF METERMATIC motor bearing lubrication and oil bath gear lubrication for long-life protection against wear.



INDUCTION HARDENING of the tough alloy steel gears gives a perfect combination of wear resistance and strength.



SIMPLIFIED GEARING with few moving parts reduces friction losses and lessens chances of breakdown.



THRUST BEARINGS handle heavy overhung loads safely by placing strain on the frame instead of the shafts.

Find out the complete story for yourself— contact your Reliance representative or write for Bulletin E-2408.

E-1509

REDUCE SPEED

RELIANCE ELECTRIC AND ENGINEERING CO.

CLEVELAND 10, OHIO · OFFICES IN PRINCIPAL CITIES

Canadian Division: Welland, Ontario

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Versatile Ed McGrath

—is our able Art Editor. We accent that "versatile" because he handles considerably more than the sparkling article layouts you see in FE's pages.

Here we find him making a final check on a picture spread. He won't have it propped up there long—because production is another function he monitors. Where he sits, the deadlines keep pressing.

That's Ed's *right hand* we've been talking about. He also wields a strong *left* for FE, preparing the popular New Packages & Products department. "Trend here," says Ed, "is a lively push in specialty foods, sparked with purchase-luring do-ups. Matter of fact," he adds, "the demands of my FE layout work parallel those for good package design. To go over, both must have highest eye appeal."

Credit him, too, for our book reviews, also for editing our automotive articles.

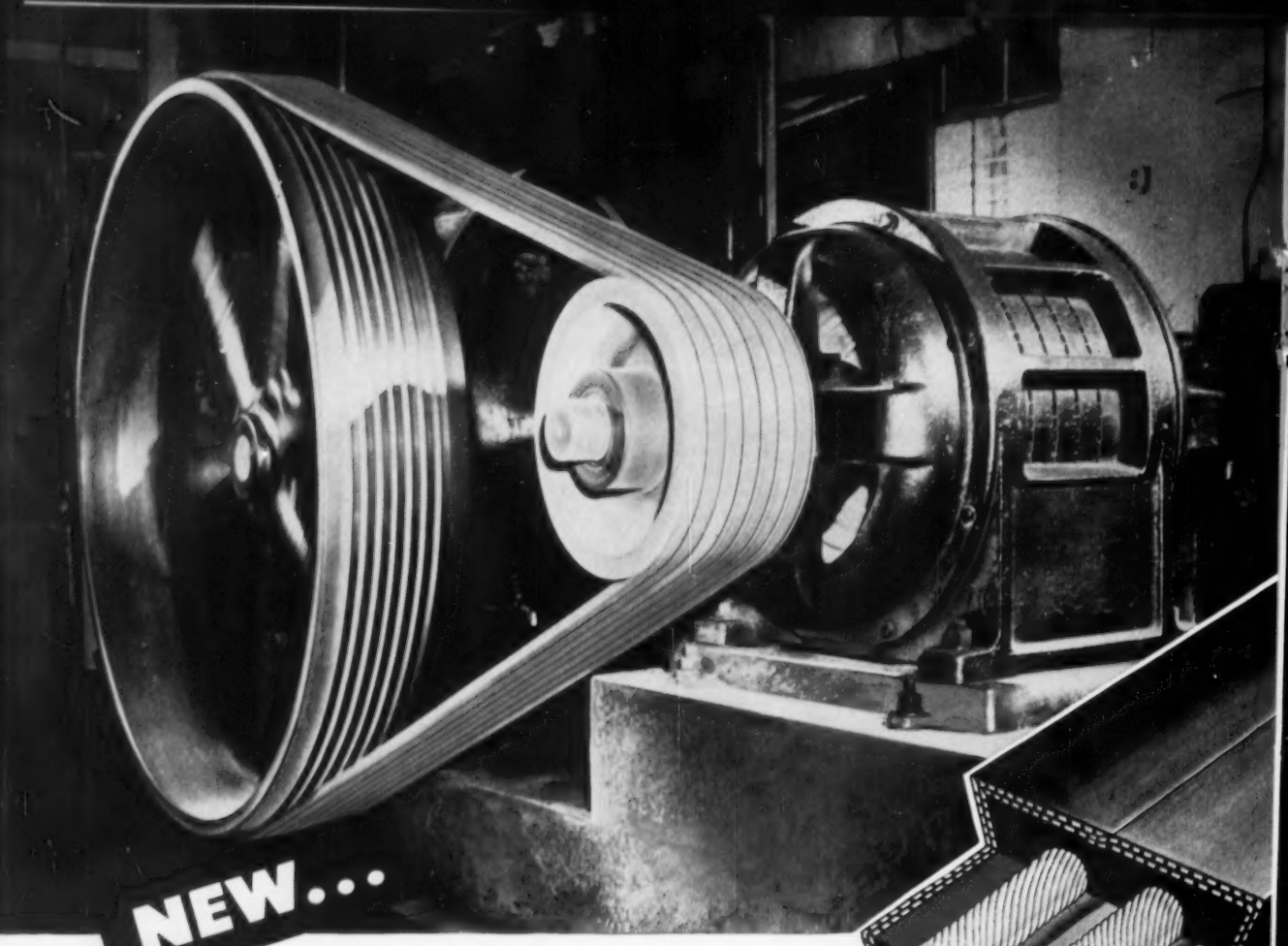
Ed first got his finger in make-up over at the *Herald Tribune*. He'd begun as writer, but then keenly recognized the potentials in the layout-production end.

But just then—1950—Uncle Sam channeled him into a quite unrelated activity. This was parachute jumping with the 505th P.I.R. Before finishing his two-year stretch, however, he was into Service writing and editing, with some P.R. work added on. He's since got his bars as a Reserve Lieutenant.

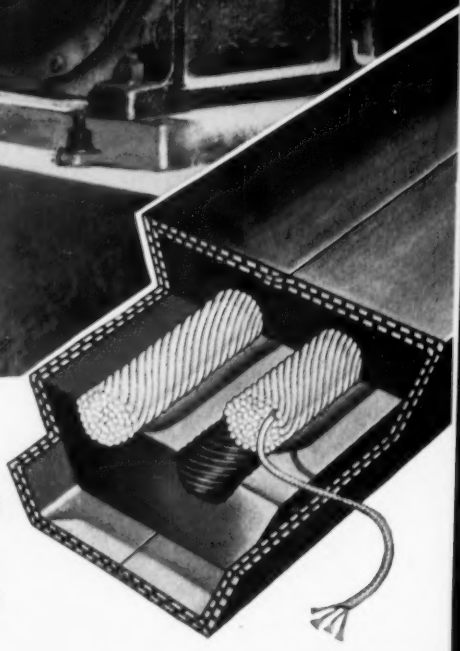
Once out of uniform, Ed resumed his chosen graphics career here on FE. And he came along fast, being named Art Editor after only seven months. He's also earned a "house reputation" for preparing exceptionally pointed production charts.

Meanwhile, Ed's been a most avid night student down at N.Y.U. where he's working toward a PhD. A member of the American Institute of Graphic Arts, he always has his eye open for new presentation ideas.

COVER PHOTO . . . Shows how single operator at console automatically makes up diverse orders of cased goods. From 69 gravity storage conveyors (left in picture), containers slide onto transverse belts (right), to be assembled (rear). See p. 66.



NEW...



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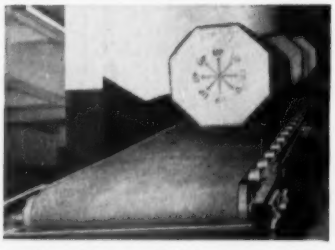
Powerflex Hi-Capacity V-Belts

40% stronger
than standard belts!

Where more driving power is called for, switch to Powerflex Hi-Capacity V-Belts. These new *premium* belts can step up the drive capacity of "under-belted" drives by as much as 40%.

If your present belts are being stretched beyond their take-up allowance . . . or if you're going to replace worn or damaged pulleys . . . change to Powerflex Hi-Capacity V-Belts. They permit you to use fewer belts and narrower sheaves . . . reduce drive costs.

Powerflex Hi-Capacity V-Belts are available in all standard sizes, and feature a special oil-resistant cover which prolongs belt life. Static conducting covers can be supplied. Order from your Thermoid Distributor, or write direct for complete information.



There's a Thermoid Conveyor Belt

. . . and Thermoid Hose for every job.

Thermoid

THERMOID COMPANY • Trenton, N.J.

TRENDS & FORECASTS

Special

FOOD ENGINEERING

Service to Executives

Failures among manufacturers of food and kindred products totaled 188 in 1956, with a loss to creditors of $10,366,000. This is an increase of 14% in number, but a decrease of 27% in losses, according to Dun & Bradstreet.

Value added by food manufacture increased 7.2% in 1955, to $14.37 billion, latest Department of Commerce survey reveals. Gain was achieved with only 1.45% more plant workers and 2.2% more production wages.

Impressive gains in value added were chalked up between 1947 and '55 by several branches: Meat, up 77%; canned and frozen foods, 53%; grain mill products, 26%; bakery products, 54%; sugar, 27%; beverages, 28%; shortening and cooking oils, 21%; corn wet milling, 55%; flavorings, 52%.

Everything favors convenience foods. Buying power is increasing, and the percentage of married, widowed, and divorced women working will rise to 40.7% by 1975, the Bureau of Census estimates.

Hot food vending expanded to 7,000 machines in its first volume year, and 65 of 92 firms handling the vendors plan to increase placement of machines for canned foods, *Vend* reports. Soup is most popular item.

Impetus for shorter week with higher pay comes from recent New York ice cream plant strike settlement. Granted were 20¢ more per hour in first year; reduction from 40 to 37½ hr. with same take-home pay plus 7½¢ per hour in second year; 35-hr. with another 7½¢ in third year. Trend means more overtime, overhead, capital investment, or all three.

Canners Optimistic

With per capita consumption of canned goods generally at record levels, canners are optimistic that they'll meet little difficulty in moving the relatively heavy stocks carried over from the 1956 pack.

Last season, exceptionally good weather produced the largest canning pack on record—over 700 million cases. Only if there's a repetition of this above-average weather will canners have something to worry about in the forthcoming marketing season.

Latest reports show canners stocks of fruits and vegetables on June 1, 1957, substantially higher than a year earlier for nearly every item reported to the Census Bureau.

Distributors stocks, on the other hand, remained fairly stable.

Some sample figures of canners stocks for these seasonal commodities are: canned orange juice, 6.5 million cases on June 1, compared to 4.6 million a year earlier; canned peaches, 7 million cases, compared to 2.5 million; canned pineapple, 6.6 million cases vs. 6.2 million; canned corn, 10 million cases, or nearly double the '56 quantity. Green bean stocks were down slightly to 5.5 million cases.

Milling Outlook Rosy

Wheat millers are looking toward their third successive year of resurgent export sales. From a postwar low of 16,888,000 cwt. in 1954, wheat flour export sales climbed back to 21,548,000 cwt. in 1955 and to 24,716,000 cwt. in 1956. In both years, the U.S. nudged Canada from

No locked-in contamination with SPARKLER SANITARY FILTERS

A completely sanitary filter. Sparkler horizontal plates can be disassembled for cleaning all interior surfaces.

You can see at a glance why Sparkler filter plates are the most sanitary plates ever designed.

All surfaces, inside and out, are easily accessible for thorough cleaning. The top screen that supports the filter paper, a center separator, and the bottom plate is all there is to it. These parts can be separated without unscrewing bolts or nuts. The tie rods of the complete plate assembly holds the plate parts firmly together without danger of bypassing.

With most other types of filter plates the inner surfaces are inaccessible and cannot be cleaned; contaminating food particles are locked in and the first run of a new batch frequently must be discarded or rerun through the filter to obtain a pure product.

With Sparkler sanitary plates, a pure product is obtained right from the start, and continues pure with fine sharp filtration to the end of the filtering cycle.

Sparkler filter plates can be removed for cleaning in one unit and a fresh thoroughly clean set lowered into the filter tank. This reduces down time to a matter of minutes.

Sparkler filters are available in stainless steel, monel, nickel, bronze, or Hastelloy, steam or brine jacketed. Available in a range of capacities up to 10,000 G.P.H.

They are efficient in filtering all food products such as:—

Candy Scrap
Chicken Broth
Cider
Egg Albumen
Extracts
Flavors
Honey
Gums
Liquors
Milk
Molasses
Syrups
Vinegar
Fruit Juices
Alcohols
Beverages
Lard
Deep Frying Fats
Beet Sugar Syrup
Beer
Wines
Whiskies

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Sparkler International Ltd. with plants in Canada, Holland, Italy and Australia.
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Trends & Forecasts

the No. 1 spot in international sales, which she had occupied since 1951.

So far this year, U.S. exports are holding the pace, at 11,554,000 cwt. through May.

Domestic sales have been "quite stable and are expected to remain so for the balance of this year," matching advances in population growth and the economy generally, according to the Millers' National Federation.

Gains in U.S. exports (which account for one third of total world trade in wheat flour) are net additions to total world trade. Canada's exports last year were virtually unchanged from the 1955 total of 16,877,000 cwt. while Australia recorded a 900,000 cwt. gain to 15,214,000 cwt. in 1956.

Other countries also boosted their wheat flour exports—to 19 million cwt. in 1956 from 18.1 million a year earlier.

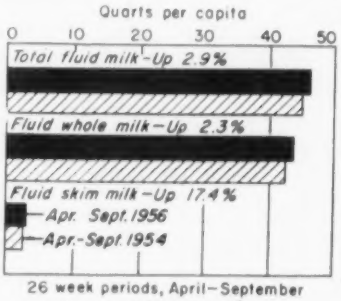
But the U.S. grabbed the major share of the expanding world market.

Outlook Bright for Sunkist

Over 19,000 acres of citrus trees have been planted in California and Arizona in the last year, about equally divided between oranges and lemons.

This is a reversal of the trend since 1946, when citrus acreage in Southern California had declined 27%.

Sale of fresh citrus fruit in the U. S. and Canada is at normal levels at good prices. The winter orange harvest of 32,000 carloads was up



26 week periods, April–September
Source: USDA Agricultural Marketing Service

FLUID SKIM MILK GAINED 17.4% in per capita consumption between '54 and '56. But it still accounts for a very small portion of the total fluid milk demand. The latter increased 2.9% in the 2-yr. period, with fluid whole milk gaining 2.3%.

← For more data, circle this page number on card at back

DAY OR NIGHT

PICK SWEET CORN WHEN THE TIME IS RIGHT!

FMC SWEET CORN HARVESTER LETS YOU PICK 'ROUND THE CLOCK —WHEN THE CORN AND YOUR PLANT ARE READY

Save minutes and dollars with the rugged FMC Sweet Corn Harvester, the only machine specifically designed for sweet corn harvesting. Reliability and dependability are proved by performance records season after season, under all conditions—in heat, dust, rain, rough fields—in night and day operation.

Minutes mean quality, for corn must be picked when it's ready! Picking delays and interruptions common to hand picking operations downgrade product quality and disrupt plant schedules. That's why each season finds more growers switching to FMC Sweet Corn Harvesters, always dependable, always on the job when there's picking to be done.

Minutes mean profits. One FMC Harvester replaces 10 to 15 hand pickers, with a reduction of up to 57% in picking costs! There's a 10% bonus in increased cut-off weight—up to 10% more corn per ton over hand picked corn. In addition, smooth, more profitable plant scheduling is assured.

1st Choice of Canners, Growers, Operators!

- Cuts picking costs up to 57%
- Delivers 10% more cases of "cut-off" corn to the cannery—less green weight
- Works day and night, under all weather conditions
- Reduces labor problems—does the work of 10 to 15 hand pickers
- Mounts on most tractors
- Simple operation, with all controls convenient to driver
- Sturdy construction throughout for trouble-free operation, lowest maintenance

Now is the time to order your FMC Sweet Corn Harvester for consistently higher yields at lower costs.

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

General Sales Offices:

WESTERN: SAN JOSE, CALIF. • EASTERN: HOOPESTON, ILL.

fmc FOOD MACHINERY AND CHEMICAL CORPORATION

Key to food equipment

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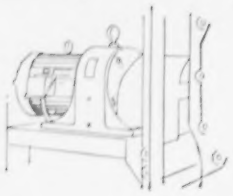
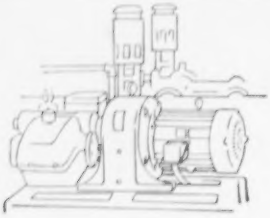
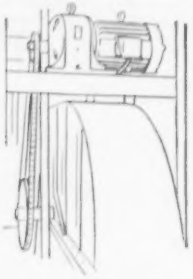
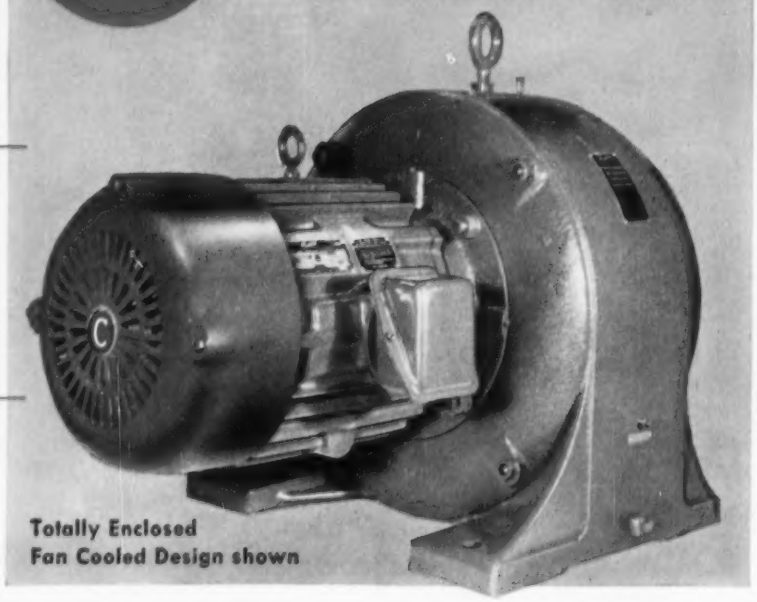
new completely redesigned Century -powered GEARMOTORS





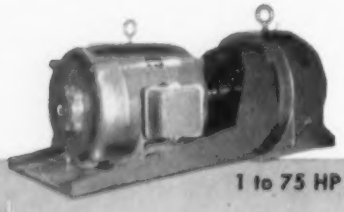




Totally Enclosed
Fan Cooled Design shown

Single, double and triple reduction available with output speeds from 750 to 7.5 RPM. 1 to 125 HP.

the right combination of quality motor and quality gearing for trouble-free service:



1 to 75 HP

Ideal where quick motor interchangeability is necessary. Double and triple reduction units with output speeds from 350 RPM to 7.5 RPM.

- **Performance-Rated© polyphase, single phase and DC Motors**
- **Duti-Rated Lifetime High-Capacity Gearing**

Newest improvements in gearmotor design—assure you top efficiency in all your slow-speed power applications! Century Gearmotors combine famous Century motor quality and precision gearing to give you increased dependability, cooler operation, maximum wear life . . . trouble-free service even under your heaviest loads! Variety of mounting positions available including downshaft and tilted shaft.

Performance-Rated to your specific needs . . . available in open drip proof, dust proof, explosion proof and totally enclosed frames. Call or write your nearby Century District Sales Office or Authorized Distributor.

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MOTORS
1/20 to 400 HP

CENTURY ELECTRIC COMPANY

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97

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slightly from the 3-year average. The summer crop of valencias is expected to be about 2,500 cars lighter than the past 3-year average. But, with improved sizes, the price is expected to be somewhat better.

The export market for fresh citrus fruit is not expected to be as good as last year's record breaking 9-million-plus cartons. Last year, the industry benefited from a 25¢-per-carton export subsidy. Also, citrus production in Mediterranean countries is up. So only 5 to 7½ million cartons are expected to be exported from California and Arizona. However, export sales of all citrus products are running 12% ahead of last year.

Sale of citrus by-products by Sunkist Growers was 9% higher than a year ago for the November-May period—$14.6 million, compared with $13.4 million.

Of particular interest is the fact that the sale of pharmaceutical products developed by Sunkist laboratories has shown a healthy gain.

Further, a new product that may boost business is being market tested —frozen lemon pie mix.

The general feeling in the California-Arizona citrus industry is one of optimism.

Soft Drinks Hit $1.3 Billion

Sales of bottled soft drinks increased 4.45% in 1956, American Bottlers of Carbonated Beverages reports. Per capita consumption hit a record 188.9 bottles, a gain of 4.2 per person over 1955.

But for the unseasonably cool and damp summer months, sales could well have gone 10 to 15% above 1955, ABCB believes.

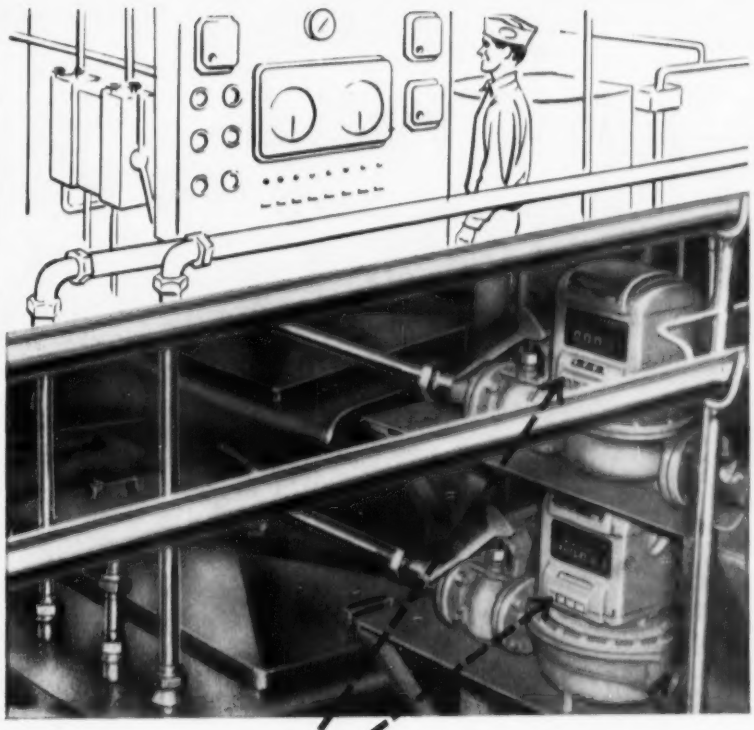
Case production in '56 was estimated at 1,321,214,000. Value of production was reported to be $1,308,000,000.

By 1967 the American public will be consuming close to 40 billion bottles of carbonated beverages each year, the association predicts, with sales exceeding $1,700,000,000.

In ten years there will be about 14 million more young people up to 19 years of age than there are now.

Frozens Boom in Britain

British frozen food manufacturers are preparing for a bumper year in production and sales. The emphasis is shifting from uncooked vegetables and fruit to cooked food and new



Measure 2 ingredients in just 15 seconds with automatic accuracy

That's all it takes for a man to set quantities and open valves on the accurate Auto-Stop meters feeding two liquids to a batch. Then he's *completely* free to devote full time to other details. The meters shut off precisely, automatically.

Think of the time saved! All liquids measured simultaneously. No waiting for weigh tanks to fill, or "inching" up to the marks on gauge sticks. No wrestling with bags or buckets. No mess, no drip, no hazard.

And think of the materials you save! Eliminates rejected batches, prevents waste of expensive materials. You get quality control like you've never had before, and each meter has a totalizer for accurate cost and inventory control.

This Auto-Stop batching meter is only one of many Neptune meters for accurately measuring more than 150 industrial liquids . . . from simple water meters to ticket-printing meters, electric switch adaptations for cycling control, and specially engineered remote control systems.

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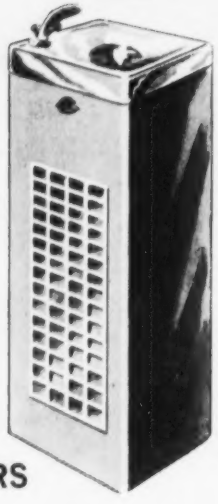
MEMO: to PAs

the products you buy will look better, last longer

with **CrysCoat®**

under the paint

CALCULATORS



. . . TO COOLERS

You're getting a better piece of equipment if it carries Oakite CrysCoat protection. It means the product has been given a paint-bonding phosphate coating before painting by the quality-conscious manufacturer. This is important to you because it means that the product is protected against the spread of rust and the peeling of paint should the finish become accidentally damaged.

Next time you purchase fans, desks, water coolers, steel lockers, lighting fixtures and similar painted equipment, investigate those with CrysCoat protection. They'll look better, last longer. For the CrysCoat story write Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.

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SCIENCE

CrysCoat *paint-bonding treatment makes products look better . . . last longer*

Export Division Cable Address: Oakite

Technical Service Representatives in Principal Cities of U. S. and Canada

Trends & Forecasts

developments in unbaked products.

Year by year sales of frozen foods in Britain have been going up, and everyone expects this trend to continue. That this optimism is not just based on the enthusiasm of a growing industry is shown by production for the current freezing season.

Last season it was around 25,000 tons. It is expected to top 40,000 tons this season, and may well go up another 20% in the next period.

The "big four" of the industry, Lyons Ltd., Birds Eye, Smedleys, and Ross Industries all are planning substantial increases.

HORS D'OEUVRES

▶ **Certain mushrooms growing wild in the world give the consumer exhilarating hallucinations. Should be packed for the poor cook. Then her family would get some pleasure out of eating.**

▶ **Newest advertising medium is a disk attached to auto front axles so that it doesn't turn with the wheel. An idea for food trucks—this stationary rolling sign that gathers moss.**

▶ Devils food cake made from prepared mix costs 42 cents; that from old-fashioned ingredients, 53 cents. Getting so you can almost have your cake and eat it too.

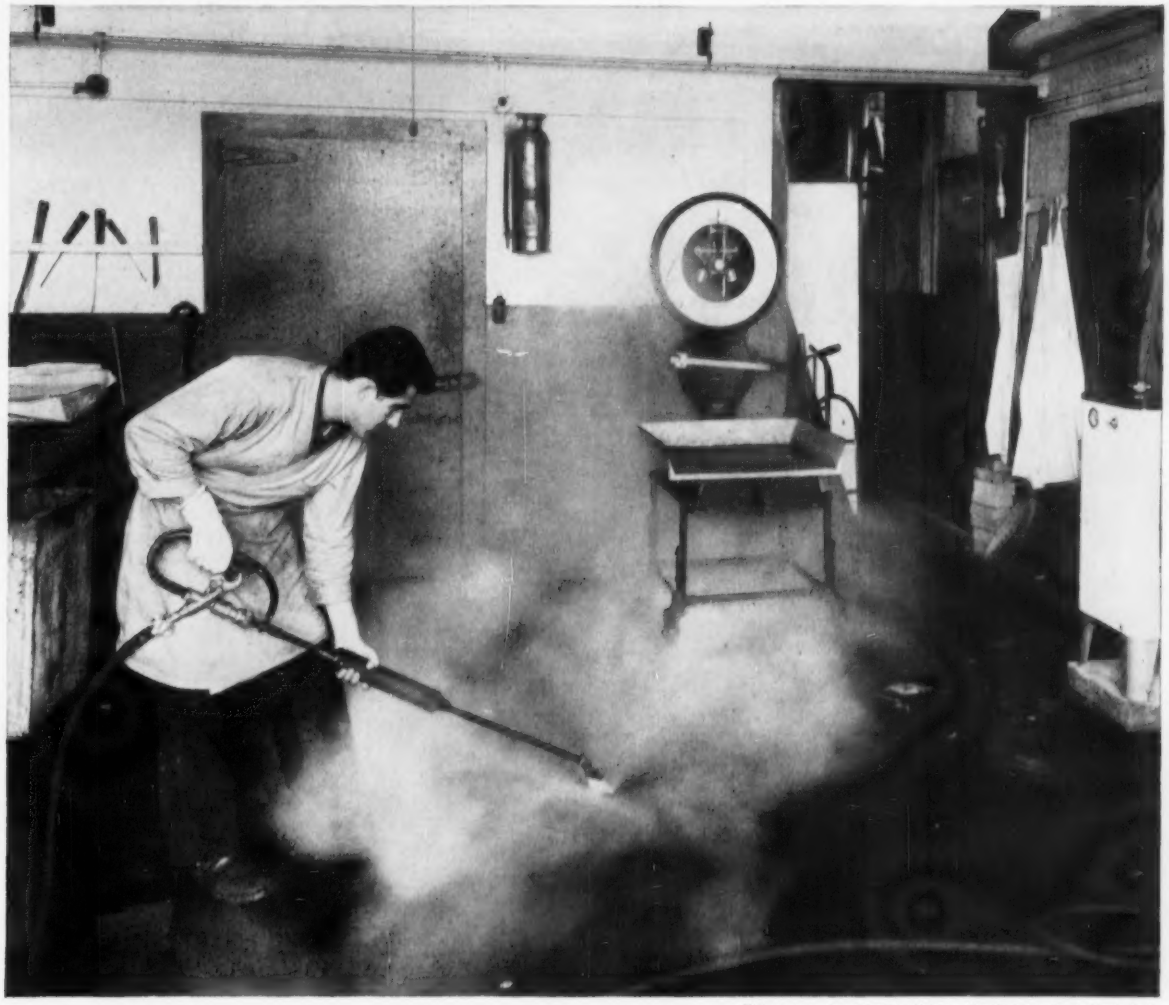
▶ **Theme of the next annual convention of food chains will be "the Powerful Penny for Better Living," symbolizing the store's measly profit. Where else can you get a dollar's worth for 99¢?**

▶ Before giving up the task as hopeless, the Tax Foundation of New York traced down 151 direct taxes on a loaf of bread. And those taxes are not optional ingredients.

▶ **Candy should be sold as a food, not as a sweet. Why not change the form and call the pieces candwitches?**

▶ Meat prices rose, boosting the cost of living, and bringing a c-of-l wage increase to 115,000 meat-plant workers . . .which could increase the price of meat, boost the c of l, and bring about some sort of endless economic escalator.

B.F.Goodrich report:



High-pressure cleaner made by Maintery Manufacturing Co., Oakland, Calif.

Hose used to go to pieces on jobs like this

B. F. Goodrich improvements in rubber brought extra savings

Problem: In this meat-cutting room they use scalding steam to clean grease from floors and work tables. But the steam hose went to pieces in a few months. Grease made the cover swell, turn gummy. The slightest snag tore it. The equipment maker needed a hose that could stand the grease, as well as heat and pressure.

What was done: B.F.Goodrich engineers went to work on the problem. They developed a hose with a special rubber cover that resists oil and grease. For extra strength they used a layer of fine-braided steel wire as reinforcement, to protect against blowouts. Heat resistant rubber is used inside the hose and between the plies.

Savings: Where hose was lasting months, B.F.Goodrich hose is now giving years of service. In fact, the maker of this steam-cleaning equipment now uses B.F.Goodrich hose 100%.

Extra benefits: In addition to making this hose oil and grease-resisting, B.F.Goodrich also made it light and flexible so it's easier to handle.

Where to buy: Your B.F.Goodrich distributor has exact specifications for the B.F.Goodrich steam hose described here. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-121, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

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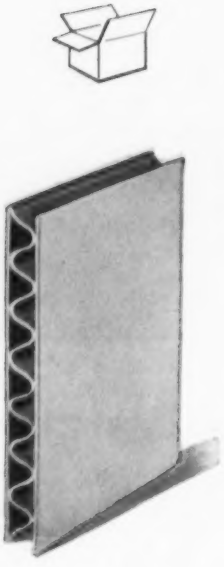
What you should know about

Why do they put "permanent waves"



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"flutes" in Union Boxes

in corrugated boxes?

The small "waves," or flutes, in the center section of corrugated board are a vital box construction feature. Like bridge trusses, they absorb and distribute shock — provide extra rigidity for the walls of your shipping container.

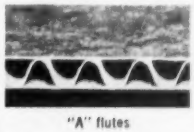
Flutes are like bridge trusses

All flutes, as the illustrations show, are not alike. No one is "best." Each does a specific job. Selecting the type you should be using calls for a detailed analysis of your product. This is one small part of Union's complete package engineering service. These fundamentals, however, are excellent guideposts:

The corrugator forms the flutes

An "A" for cushioning

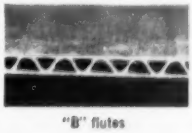
"A" flutes were the first type used in corrugated box manufacture. They have the highest arches—about 3/16 inch. "A" flutes are generally used for fragile articles because their added height offers extra cushioning and better stacking strength.



"A" flutes

"B" flutes–smallest and stiffest

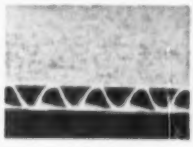
"B" flutes are lower, stiffer than "A," have 42 per cent more flutes per foot. Because of reduced thickness, "B" flute board makes a neater package, takes up less warehouse and car space. Excellent for heavy items like canned goods which support their own weight, thus require less shock resistance.



"B" flutes

"C"—the in-between flute

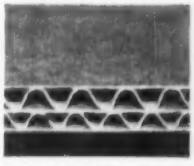
Half-way and happy medium between "A" and "B" are "C" flutes, probably the most commonly used today. They combine the best features of the other two and are often an excellent compromise.



"C" flutes

Combinations may be needed

Flutes may also be combined, one on top of the other, to form a double wall container. The combinations most generally used are "A"-"B" and "C"-"B." The double walls provide greater protection and cushioning, and are ideal for heavy duty containers.



"B"-"C" flutes

Union Box engineers are always ready to help you determine the proper flute, or combination. You'll find, too, that the flutes in Union Boxes are consistently well formed—each of uniform height—each taking its full share of the load.

This sturdy construction is one of your best assurances of dependable performance of your corrugated shipping container.

union camp

Write for Union's free, informative booklet "Manufacturing Sheets for Corrugated Boxes."

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Bromelin

joins the front rank of Takamine enzymes...

Bromelin, a highly potent protein-digesting enzyme derived from the pineapple plant, is excellent for use in meat tenderizers, baked goods, chillproofing beer and in many other food applications. New *bromelin* is an excellent companion product to the many TAKAMINE enzyme products derived from bacterial and animal sources.

DIASTASES — For liquefaction and hydrolysis of starch to produce soluble dextrins and sugars. Also removes starch, eliminating filtration problems and turbidity.

PECTIC ENZYMES — For the hydrolysis of pectins in fruit and fruit juices in order to speed processing and to make fruit juices sparkling clear for consumer appeal.

PROTEINASES — For the modification and hydrolysis of proteins in food manufacturing and pharmaceutical operations.

GLUCOSE-OXIDASE — To prevent browning due to glucose or oxygen, and to increase shelf-life of beverage products.

Takamine Enzymes
make it taste *better*,
look *better*, sell *better*

For complete information write to:

TAKAMINE **Takamine Laboratory**

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DEVELOPMENTS TO WATCH

Special

FOOD ENGINEERING

Service to Executives

Heinz is successfully utilizing a nuclear continuous density controller for a heavy, viscous product. Harmless radiation passes through the product in proportion to density and is detected to actuate control.

Aluminum can production is about ready to break loose. Imported German extrusion can process has triggered plans by two larger container companies and an aluminum firm. Price of aluminum is current deterrent.

Automatic warehousing and order make-up offer big cost-cutting opportunities. A wine firm stores cases on 69 gravity conveyors, then one man at control console directs flow of cases to route trucks to fill orders.

Shipping damage has been practically eliminated by Green Giant with compartmentized railway cars. Unloading time at stop-off points has been cut, too. Ends of cars are loaded, divider gates are closed, then center is filled.

By built-in hydraulics, new automotive truck body can be lowered to rest on street, raised 54 in., or tilted endwise and sidewise to speed loading and unloading. It is a Thompson Trailer development.

Costs are cut by palletless handling at Procter & Gamble. As many as 412 cases of product weighing 3,000 lb. are picked up by lift-trucks equipped with large rubber-surfaced squeeze plates.

Nickel-alloy coating can be applied to ferrous metal pipe, sheet, conveyors, and machine parts by a new process. From 0.001 to 0.025 in. thick, the coating bonds to the metal like brazing alloy.

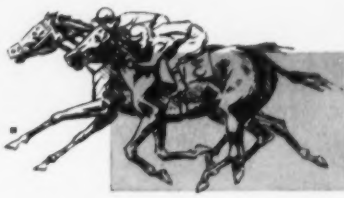
Pump with glass coating on all inside parts has been developed. It has high corrosion resistance, prevents metal pick-up, and is of 3-piece Teflon gasketed construction for easy cleaning.

Flavors (such as essential oils) are impregnated into carried materials (like bland spices) by mixing first under vacuum, then at atmospheric pressure. Spice carriers have antioxidant properties.

Vitamin K has been used experimentally to inhibit bacteria and stop fermentation. Oregon State researchers believe it to be superior to sulfur dioxide as a wine "preservative."

Regulation of frozen prepared foods by bacteria count may be expected. Packers and food and drug officials are cooperating in plant surveys to determine counts for meat pies. Breaded seafoods are next.

THAT LITTLE EXTRA . .



MEANS SO MUCH . . in Metal Packaging

Fifty-six years of metal packaging *experience* becomes an integral part of *your* business when your product is packed in a metal can from Heekin. All of the economies and advantages of product planned can production, design, color, sales appeal and development are yours with Heekin Product Planned Cans. Remember . . . Heekin Personal Service is as close as your telephone.

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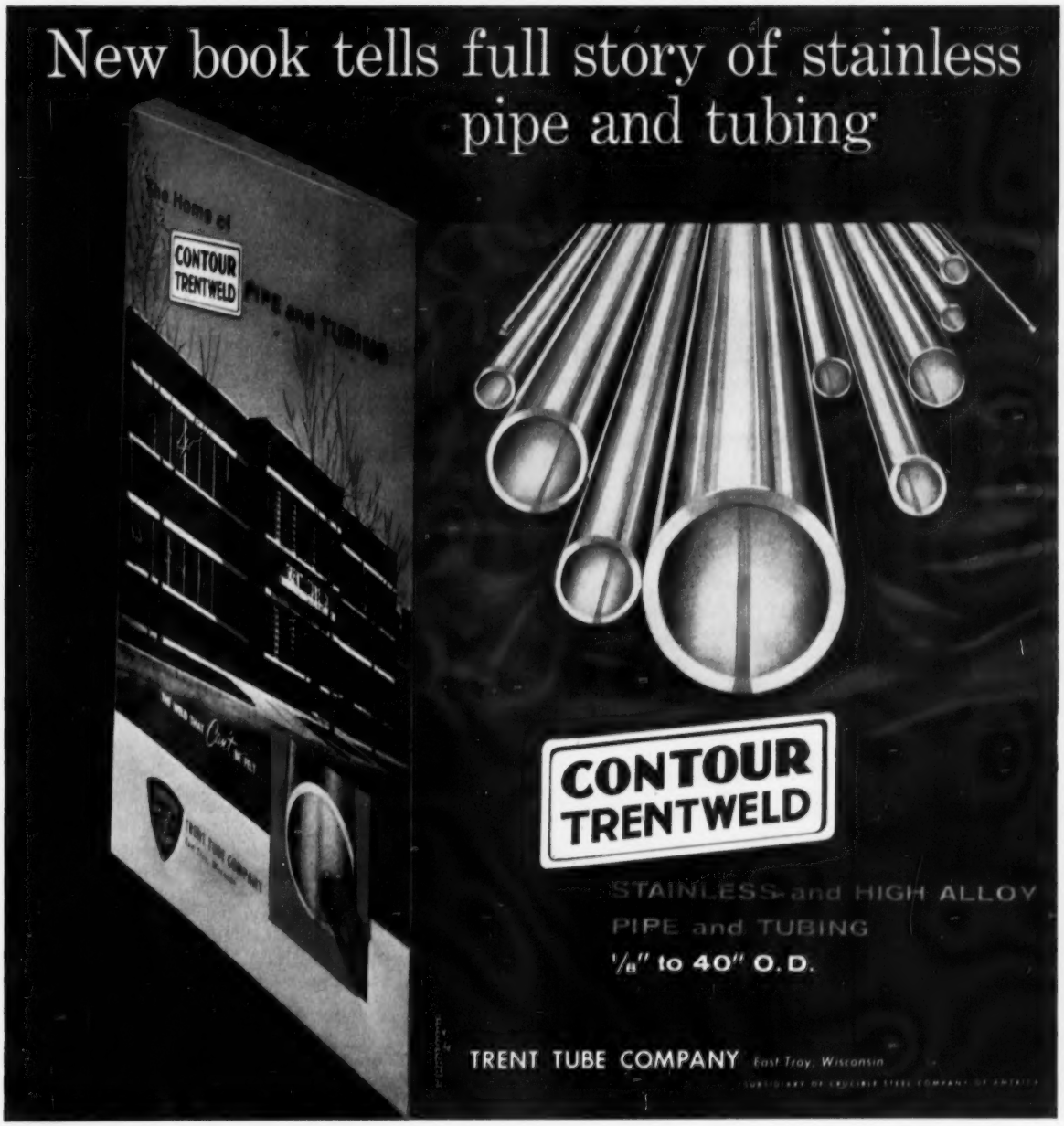
New book tells full story of stainless pipe and tubing



If you use stainless or high alloy pipe or tubing, this new illustrated handbook was written for you. It's 58 pages big – packed with informative data that you'll refer to again and again.

The table of contents is too long to list here, but it includes, for example, analysis and conversion tables, corrosion characteristics, weights, alloy properties, bending, joining and installation hints.

We can't guarantee how long the supply will last. To be sure of getting your free copy, why not clip and mail the coupon now?

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A Subsidiary of Crucible Steel Company of America
GENERAL OFFICES: EAST TROY, WISCONSIN
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East Troy, Wisconsin

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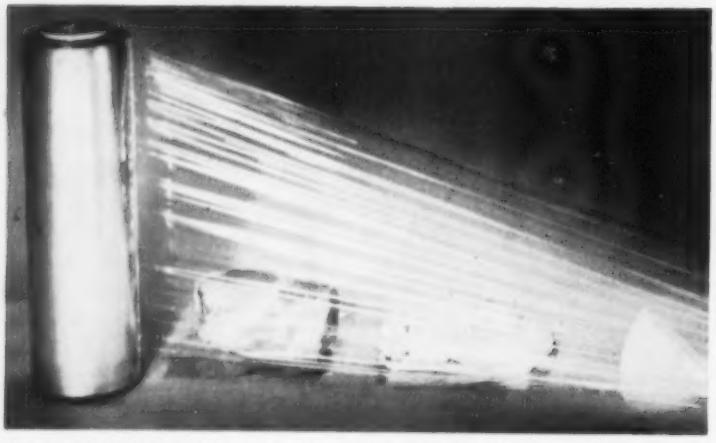
Crystal Clear Shrinkable Roll-Film

Special Saran-type polymer produces material with easy-sealing characteristics and strong product-protecting advantages for hand-wrap and machine applications



NEW PRODUCT is initially aimed at meat, poultry, and cheese products.

COMPACT hand-wrapping set-up, similar to unit used at Tobin Packing Co., comprises standard film dispenser, table, and sealer (left), and new hot-air shrinking tunnel (right). Superior product cling and quick, positive heat sealing characteristics produce a neat package and boost wrapping speed.

EXTRA VERSATILITY in packaging is now offered processors in a new roll-type film.

It is a product just released for general sale after an extensive series of market and application tests. Maker is the Cryovac Co., Div. of W. R. Grace & Co., Cambridge, Mass.

Principal advantages of this latest material are its thermo-controlled, oriented shrinkage, strong and easy heat seal, sparkling clarity, and high resistance to penetration by moisture, gases, oils, acids, and alkalis. And it is easily printed by flexographic means.

Not a cheap film—at least at this time—the new product seems slated for those food applications where eye appeal and top product protection are a must. Two companies that had found these requisites a problem—Tobin Packing Co., Rochester, N. Y., and Colonial Packing Co., Boca Raton, Fla.—are already using the material for commercial wrapping of picnics, butts, and shingle-pack bacon.

At present, the manufacturer is shooting only for pre-packaging operations, where odd-shaped items—as cheese, poultry, and meats—are still extensively packed by hand and semi-hand methods, and require a stringent barrier against oxygen and moisture transmission.

However, in the case of Colonial, the material is now running on an automatic overwrapper (Package Machinery Co.) for bacon. And Cryovac is working hard on adapting other high-speed automatic and semi-automatic packagers to handle the film.

What Is the Material?

Basically, the new film is similar in chemical composition to that used

Makes Packaging Debut

in the well-known Cryovac bag—being a special Saran-type polymer (polyvinylidene chloride). The formula has been modified, of course, to gain extra clarity, cling, and yield—and to enable the production of a much thinner film.

Plain and printed films are available in clear and orange-tinted forms and in two thicknesses—60 and 75 gage(0.6 and 0.75 mil). The thinner gage is recommended for in-store wrapping applications, the thicker for processor packaging.

Yield runs 17,500 sq. in. per lb. for a 1-mil thickness—rather low as films go, because Cryovac has a comparatively high specific gravity (about 1.58).

However, company officials point out that its superior protective properties allow a thinner film to be used on the product, and they declare that the cost is not high in terms of product protection per packaging dollar.

Other mechanical and chemical properties of the new film product are as follows:

- Tensile strength (73F.)—7,000-14,000 psi.
- Elongation at break—70-115%
- Maximum shrink (205F.)—60-65%
- Shrink at 185F.—45-55%
- Burst strength (Mullen)—35-40 psi.
- Tear strength (Elmendorf)—Over 25g./mil
- Folding endurance—Excellent
- Sealing range—195-210F.
- Softening point—270F.
- Melting point—About 290F.
- Water vapor transmission—Less than 0.75g./24hr./100 sq. in./mil

In addition, the material shows negligible water absorption, a very low permeability to oxygen and carbon dioxide, and excellent resistance to organic solvents, oils and greases, and alkalis and acids (except ammonia, sulfuric acid, and nitric acid).

It also displays no dimensional changes under high relative humidities, has good resistance to sunlight, is non-flammable, and stands up very well in storage (below 76F.).

How Is It Used?

To date, test market and actual production operations employing the new film have been mainly on a hand-wrap basis. And the company has now developed a new wrapping unit—consisting of a film dispenser, Teflon-coated hot plate, and hot-air shrink tunnel—that will greatly speed this operation.

The unit will have a calibrated wrapping surface for accurate measurement of film sheets, and can be adapted to existing hot-water shrink tunnels or used in conjunction with the new hot-air tunnel, thus forming a compact, efficient packaging center.

During test marketing, cheeses, smoked meats, and cut-up chickens were packaged—using diaper (diagonel), drug (square), or twist-type wraps as the product and equipment warranted.

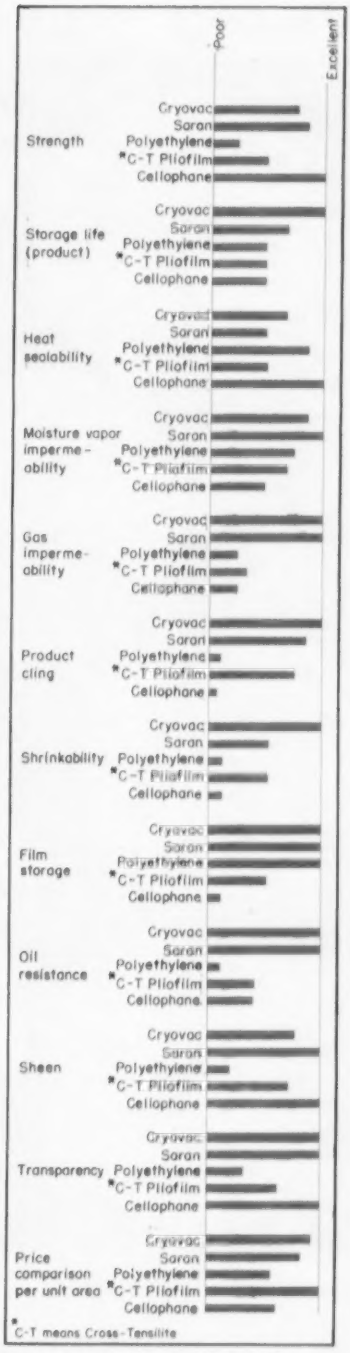
On block and wedge shaped cheese, the diaper wrapping method proved easiest and most economical. For half-moon shapes, a modified drug wrap filled the bill.

For smoked butts and picnics, a roll and diagonal seals were used, respectively. Also, twist wrapping equipment was employed with great success. Here, wrapped meat is spun on a machine, the film being held in place by two pig-tails.

In packaged poultry, the cut-up parts were fitted into the tray in an "overflow" pattern to eliminate air pockets. A diaper wrap was used to apply the film. Hot air shrinking equipment gave best results and was coupled with a loose wrap.

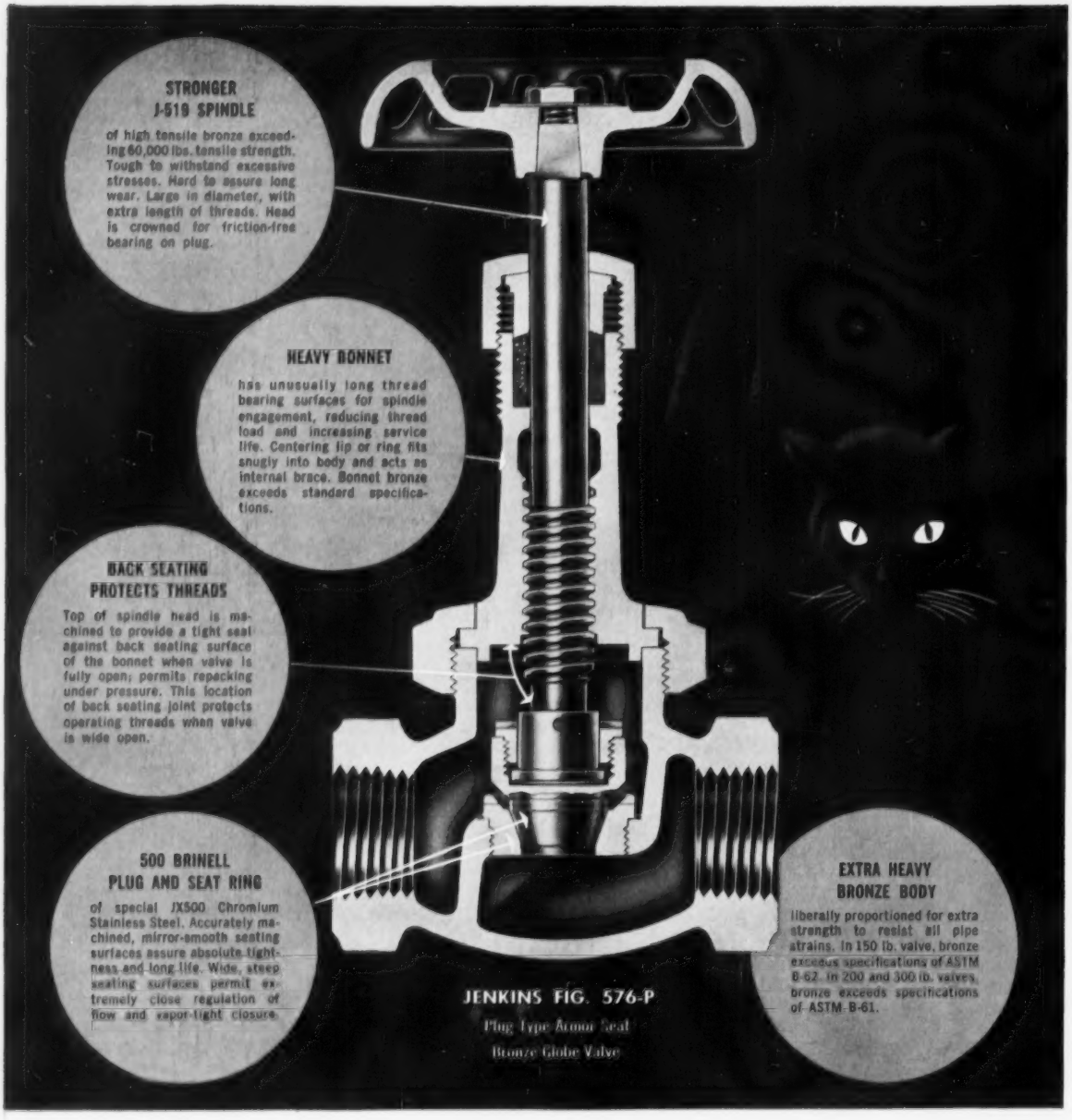
At Colonial Packing Co., the material has been adapted to high-speed overwrapping with only minor modifications in mechanical action.

Because of the film's superior product cling, a very short underlap has been achieved in this application.



FINE PERFORMANCE of Cryovac is disclosed in maker's chart comparing five films. All were judged on basis of a 1-mil thickness. Note new material's excellent rating in storage life (product and film), moisture and gas impermeability, product cling, shrinkability, oil resistance, and transparency. However, current-price comparison (bottom of chart) shows film to be relatively expensive at this time.

Where valves need 9 lives...


STRONGER J-519 SPINDLE
of high tensile bronze exceeding 60,000 lbs. tensile strength. Tough to withstand excessive stresses. Hard to assure long wear. Large in diameter, with extra length of threads. Head is crowned for friction-free bearing on plug.
HEAVY BONNET
has unusually long thread bearing surfaces for spindle engagement, reducing thread load and increasing service life. Centering lip or ring fits snugly into body and acts as internal brace. Bonnet bronze exceeds standard specifications.
BACK SEATING PROTECTS THREADS
Top of spindle head is machined to provide a tight seal against back seating surface of the bonnet when valve is fully open; permits repacking under pressure. This location of back seating joint protects operating threads when valve is wide open.
500 BRINELL PLUG AND SEAT RING
of special JX500 Chromium Stainless Steel. Accurately machined, mirror-smooth seating surfaces assure absolute tightness and long life. Wide, steep seating surfaces permit extremely close regulation of flow and vapor-tight closure.
EXTRA HEAVY BRONZE BODY
liberally proportioned for extra strength to resist all pipe strains. In 150 lb. valve, bronze exceeds specifications of ASTM B-62. In 200 and 300 lb. valves, bronze exceeds specifications of ASTM-B-61.
JENKINS FIG. 576-P
Plug Type Armor Seal
Bronze Globe Valve

Install this JENKINS...made to defeat valve-killers

HERE are just five of the eighteen ways by which Jenkins Plug Type Valves have been engineered for maximum wear in valve-killing services. For any close-control steam service like drains, bypass lines, drips, blowoff, throttling, bleeders . . .

Or where abrasion, entrapped pipe chips, scale or rust tubercles are a problem . . .

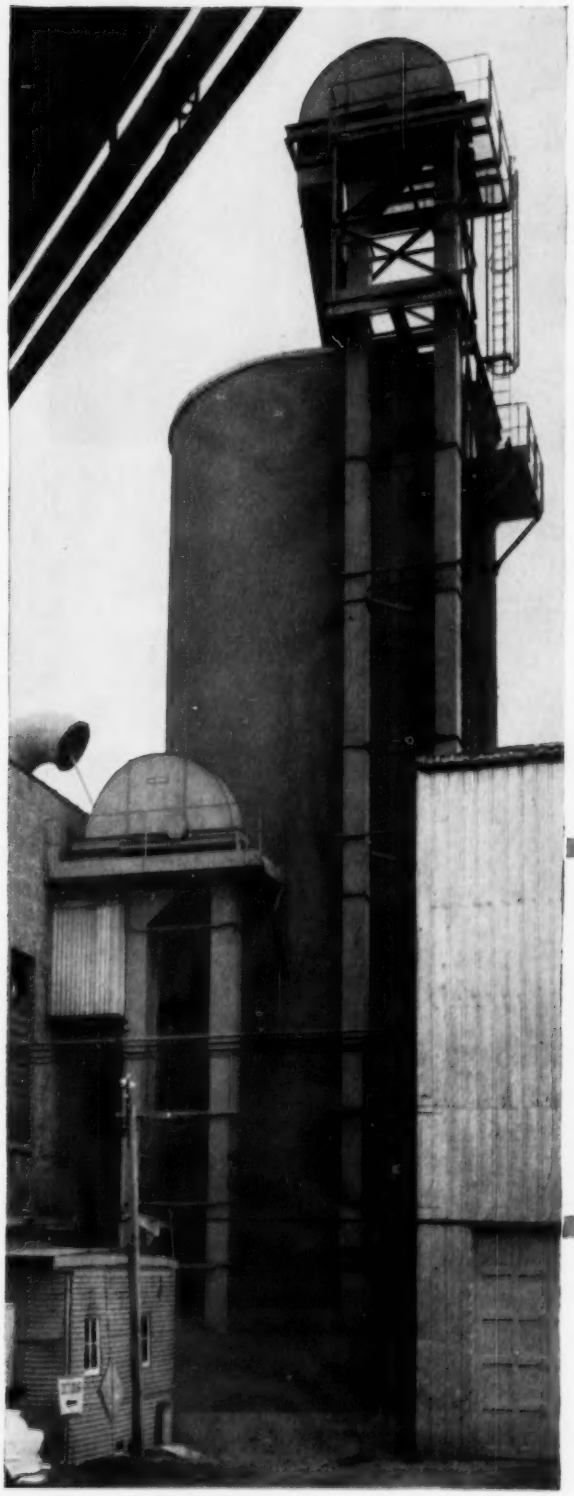
You'll cut maintenance and replacement costs by specifying *"Jenkins Plug Type, with the 500 Brinell Stainless Steel Armor Seat"*. In the Jenkins Catalog are 150 lb., 200 lb. and 300 lb., Globe and Angle, screwed or flanged end valves in a full range of sizes. And, they are available quickly from local distributors' stocks.

WRITE us, or ask your Jenkins distributor for descriptive folder No. 202-A. Jenkins Bros., 100 Park Avenue, New York 17.

JENKINS
LOOK FOR THE JENKINS DIAMOND
VALVES
SINCE 1864 TRADE JENKINS MARK

Sold Through Plumbing-Heating and Industrial Distributors

Why alignment is built into LINK-BELT bucket elevators *at the factory... not in the field*



Link-Belt makes and integrates all components to speed assembly

EVER buy a "bargain" bucket elevator—then run into unreasonable installation costs? If so, you'll appreciate the ease with which Link-Belt bucket elevators are assembled. All components are carefully manufactured, assuring ready alignment. And because *Link-Belt makes them all*, they're integrated to match perfectly, operate smoothly.

At your request, Link-Belt will also accept erection responsibility. Particularly important if you're planning a new plant, this service—backed by Link-Belt's unequalled background in bucket elevator engineering—can contribute greatly to assuring over-all efficiency of your system. A Link-Belt representative awaits your call for a consultation.

- **HEAD SECTION COMPONENTS** — bearings, head shaft and sprocket—are chosen from Link-Belt's complete line on the basis of material to be handled and capacity requirements. Chains suitable for all service conditions are available.
- **INTERMEDIATE CASING SECTIONS** are fabricated for convenient assembly and assurance of accurate alignment. Casings are self-supporting. Occasional lateral tie-ins may be required where unusually great heights are involved.
- **BOOT COMPONENTS** incorporate bearings suitable for adjusting elevator chain to proper tension. Large access door makes routine inspection and adjustments quick and easy.
- **BUCKETS** — all types and sizes suitable for handling all kinds of materials are available from stock.

Designed for maximum elevating efficiency . . .

POSITIVE DISCHARGE elevators handle light, friable or sluggish materials and those having a tendency to stick to buckets.

INTERNAL DISCHARGE bucket elevators handle chips, pellets, nuts, seeds, etc. gently and at high capacity. Double head shafts operate in fixed bearings.

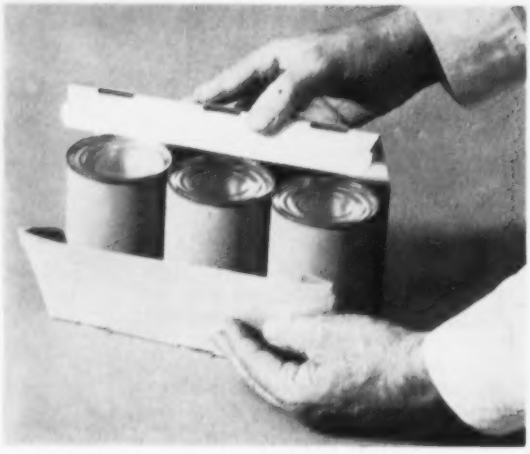
LINK-BELT

BUCKET ELEVATORS

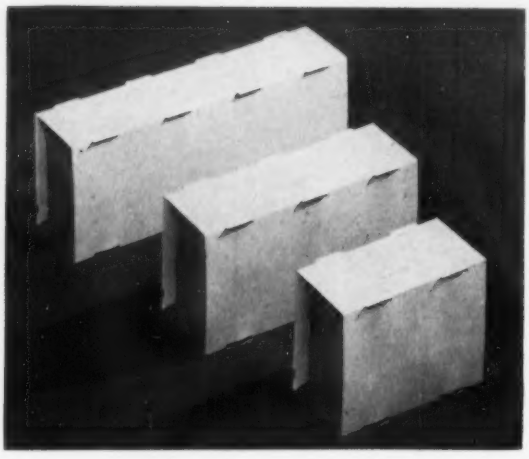
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.605

For more data, circle this page number on card at back →

NEW PACKAGES & PRODUCTS



Hand-assembled Multi-Pack . . .



. . . gives neat, economic package

Economic Multi-Can Carrier

If you're interested in test marketing a multiple-carrier for a canned product, Lord Baltimore Press has the answer. The supplier has developed–and is now manufacturing–a single line multi-pack which will hold from two to six cans.

The carrier is manually applied, an advantage to the processor who wants to test his sales before installing the equipment needed for a full scale operation.

A clever locking design gives a tight and secure seal. Full display surface may be utilized for the sale message.

The carrier might also be used by a processor for special promotions, tie-in sales, or as a special sales effort at the end of a season.

The sleeves are made to fill all standard can sizes.

Circle 24A on Readers Service Card

Adds Beverages to Line

The first non-ice cream product in its 37-year history has been introduced by Good Humor Corp. Due to make its initial appearance in selected markets this Spring is the company's line of fruit flavored soft drinks.

Flavors will include orange, grape, black cherry, root beer and ginger ale. Bottle sizes will be 7-, 10-, 12-, and 26-oz.

Processor Adds Gourmet Line

General Foods Corp. has announced plans to market a line of gourmet specialty foods in late 1957. Initial distribution will be limited to the specialty food outlets.

Three reasons are given by the processor for the decision to begin the new line:

- Though a limited market, specialty food sales should contribute to the gross earnings.
- The line of specialty foods will contribute to the corporate image GF is attempting to build in the public eye.
- The new line may occasionally uncover a product suitable for mass distribution.

The gourmet line will include biscuits and cookies, preserves, soups, cocktail snacks and hors d'oeuvres, entrees, entree sauces, desserts, coffees and teas.

Brand name will be General Foods Gourmet Foods. Majority of the items will be imports–lobster bisque from France and hearts of palm from Brazil, for example.

The decision to enter the specialty food line was announced by Charles G. Mortimer, president of General Foods, at the annual stockholders meeting in July.

New Thin-Gage Cellophane

Though it is still in the experimental stage, Du Pont has announced development of a new thin

Burry's has a reason...

Keeping deluxe cookies tasting just as good out of the box as out of the oven is a job for waxed glassine. And the eye appeal of Burry's white waxed glassine inner liner, printed in gold, sure sets the taste buds a goin'.

Protected by Riegel means much more . . . a complete, *engineered* system of packaging:

Product protection *always*, plus . . .

Paper tailored to run at high speed on automatic machines.

Paper made to your own specifications . . . plain, laminated, waxed, poly-coated, printed.

Paper that is made right, that will run right, that is priced right.

Hundreds of today's best-sellers benefit from Riegel's uniformly effective system of product protection. You can, too.
Write Riegel Paper Corporation, 260 Madison Avenue, New York 16.

Burry's new Masquerade assortment of French cookies uses a printed inner liner of Riegel's opaque waxed glassine.

ALGIN CORPORATION OF AMERICA

Marine Colloids

CARRAGEENATES

Gelcarin® Viscarin®
Caralak® Nutricol®

ALGINATES

Sodium Alginate Potassium Alginate
Calcium Alginate Alginic Acid

"The ingredients you use BY THE PINCH to make better products BY THE POUND"

For example:

1 ounce of Gelcarin produces permanent cocoa particle suspension in 125 quarts of chocolate milk.

1/200th of 1 per cent of Gelcarin in ice cream prevents whey separation and ice crystal formation, improves texture and melt-down control.

2.9 grams of Nutricol-200 added to 13 ounces of evaporated milk, hand-whipped and frozen in the family refrigerator, makes ½ gallon of ice cream.

These are some of the things our materials are doing in the food industry today – very economically in small amounts that go a long way.

We also know that these pure marine colloids possess unique characteristics that can cut costs, improve present food products, and even create new products.

Their outstanding effectiveness as bodying, stabilizing, suspending, and gelling agents has become increasingly recognized, and has made them a *must* in many food uses. Less well known is their astonishing versatility – which keeps research departments humming.

Let us work with you . . . and explore with you the possibilities these colloids hold for helping you with an idea you may have for a desired improvement in an existing product, or for the development of a new product.

Write us. Our technical department is waiting to be of service to you.

ALGIN CORPORATION OF AMERICA

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Canadian Sales Representative – Charles Albert Smith Ltd.
356 Eastern Ave., Toronto 8 • 8307 Royden Road, Montreal 9

gage polymer-coated cellophane with greatly improved durability and appearance.

The 300-gage K-203 material is now being tested commercially and will soon be added to the supplier's line of packaging films.

Characteristics are similar to those of the heavy-gage polymer-coated films. The new thin gage will make it economically feasible to use polymer-coated cellophane for carton overwrapping.

Circle 24C on Reader Service Card

Seamed Biscuit Cylinder

Recently perfected by American Can Co. is a lap-seam, paper-body cylinder with metal ends. Reported as the first instance where a true double-seam holds the ends to the body, the can is currently being used to package refrigerated biscuits.

Body is formed from bleached kraft. Aluminum foil provides a laminated inner and outer liner.

Circle 26A on Reader Service Card

Streamlined Jelly Jar

Directed at spurring impulse sales of its brand of jellies is Kroger Co.'s "table server" jelly jar.

The new jar has a sloping waistline that cants the label toward the shoppers eye. Horizontal flutes on the upper half of the container add highlights and accentuate the size of the package.

For stability on high-speed filling, capping, and labeling lines, the "table server" has a large base and contact points between jars at both base and shoulder. A wide mouth is closed with a twist-off vacuum cap.

The jars are manufactured by Armstrong Cork Co.

Circle 26B on Reader Service Card

Condiments in Jars

R. T. French Co., Rochester, N. Y. is now packaging its instant garlic powder and instant onion powder in wide-mouth glass jars. Jars and caps are manufactured by Hazel-Atlas Glass Division of Continental Can Co.

Circle 26C on Reader Service Card

New Laminated Coffee Bag

Morning Treat Coffee Co., Baton Rouge, La., is packaging its high-roast, extra dark coffee in a bag made

THE BOX SETS THE STAGE...

Gaylord Boxes

. . . when you raise the curtain on your new product. A modern container dramatizes the features of your product. Yet, the cost of a fresh design for your box is just a small fraction of what you spend on product development.

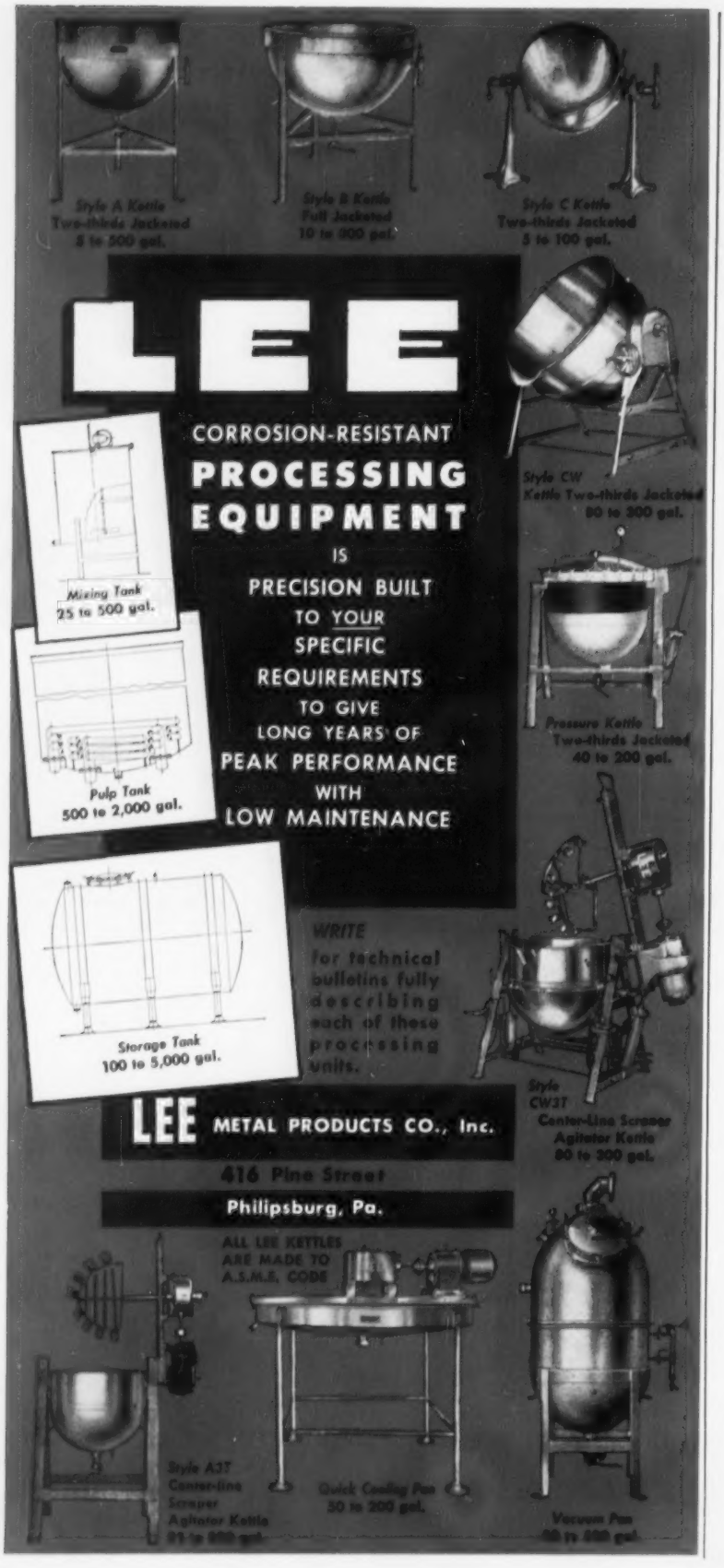
Strikingly handsome printed effects are now made possible by Gaylord's newly-developed "Oyster White" boxboard. For samples and complete information, call your nearby Gaylord office.

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

For more data, circle this page number on card at back →



Packages & Products

from Continental Can Co.'s Lamofoil. The material is a laminate of aluminum foil, acetate film, and bleached kraft, lined with amber glassine.

The combination of materials is designed to give the longest possible air and moisture vapor protection to the coffee, yet offer an attractive package.

Machine packed and sealed by glue, the bag is a self-opener and will stand without support.

Circle 26D on Reader Service Card

Decanter Bottle for Beverage

Latest entry in the non-fattening soft drink field is Hoffman Beverage Co.'s Streamline brand. Packaged in an attractive decanter-style 14-oz. bottle, the beverage is now distributed in the New York metropolitan market.

The non-returnable bottle is manufactured by Owens-Illinois.

Circle 28A on Reader Service Card

New Packaging Paper Debut

Development of a new foil packaging paper for cake mixes, cereals, and other dry powdered products has been announced by Dobeckmun Co., Cleveland.

Designed to perform on Pneumatic Scale Co.'s double package maker, the paper offers a high degree of protection from moisture and

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

How Large Plants Reduce Costs of Salt Handling and Brine Making

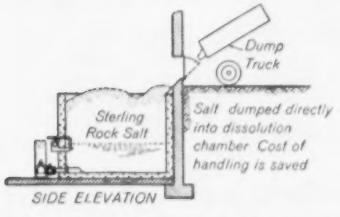
Many of today's large users of brine are saving money on salt deliveries, on handling salt in the plant, and on the production of saturated brine . . . by installing one rugged, permanent piece of equipment, a Storage Lixator. This unit (the exclusive development of International Salt Company) is a large combination salt-storage and salt-dissolving tank.

The Storage Lixator is strong—can easily hold the weight of heavy trucks or railroad cars. It's adaptable—can be located almost anywhere, either below or above ground, either inside the plant or outside. It's fully automatic—continuously replenishes whatever amounts of brine are drawn off through the piping system to points of use. And it needs no maintenance.

Another money-saving feature: with the Storage Lixator, brine-storage tanks are rarely necessary. This is because International's Lixate principle, on which every Storage Lixator is based, makes use of "Wet Storage"—meaning that undissolved salt is stored in the same tank with saturated brine. Even when the Lixator is completely filled with salt, there is ample room between the salt crystals for storing fully saturated brine.

The operation of every Storage Lixator is basically the same, but there are many design possibilities, by which International's Lixate principle can be adapted to any plant requirements. Here are some typical Storage Lixators, showing how they are engineered to meet specific needs.

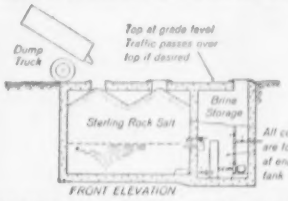
1. The Inside Single-Compartment Storage Lixator . . . ideal for congested areas where outside property is not available.



Salt is dumped from a truck directly into the dissolving chamber (the Lixator is just inside the plant wall), and salt-handling costs are reduced. The Lixator controls are easily accessible from inside the plant.

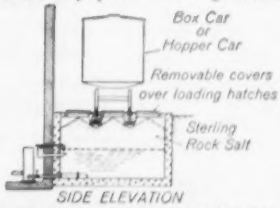
2. The Shed-Type Storage Lixator is very practical for small-scale storage and dissolving operations when space is available adjoining the plant building. Large doors permit easy salt entry by portable conveyor belt fed directly from a dump truck or railroad car. With this setup, any available space can be used for an inexpensive brine-making unit inside the shed.

3. The Integral Brine Tank Storage Lixator . . . one of the best for manufacturing operations which require large amounts of fully saturated brine only at certain times. (The brine-storage tank included in the Lixator can be made as large as necessary.) Because the top of this Lixator is at ground level, traffic can pass over it—and delivery trucks can pour salt directly into the loading manholes.


Dump Truck
Top at grade level. Traffic passes over top if desired
Brine Storage
Sterling Rock Salt
All controls are located at end of tank
FRONT ELEVATION

4. The Underground-Tank Storage Lixator is a single-compartment rock-salt storage and dissolving unit which adjoins a railroad siding. With the top of the Lixator on the same level as the floor of the railroad car, salt delivery by power scoop, or portable conveyor belt is an easy operation. Fully saturated brine, made automatically in this Lixator, can be pumped any distance to the points of use.

5. The Undertrack Dual-Unit Storage Lixator . . . popular with large salt users.



It has been found that its relatively high installed cost is more than offset by the most inexpensive salt delivery method known today (and possible only with this undertrack design). A railroad hopper car passes over the Lixator, and salt drops directly into storage. No conveyor belt is needed, and salt delivery is entirely automatic.

6. The Dual-Compartment Storage Lixator is designed for plants which use exceptionally large amounts of saturated brine. There are two separate dissolving compartments, storing an ample supply of brine for every need. The control room is located between the two storage and dissolving chambers. This unit, with its extra-large storage capacity, permits very economical purchasing and handling of salt.

There are many other types and designs of Storage Lixators—along with numerous refinements to suit your particular needs.

TECHNICAL SERVICE WITH YOUR SALT

Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt you use. International produces both Sterling Evaporated and Sterling Rock Salt in all types and sizes. And we also make automatic dissolvers in metal or plastic for both kinds of salt. So we can recommend the type and size of salt most perfectly suited to your needs.

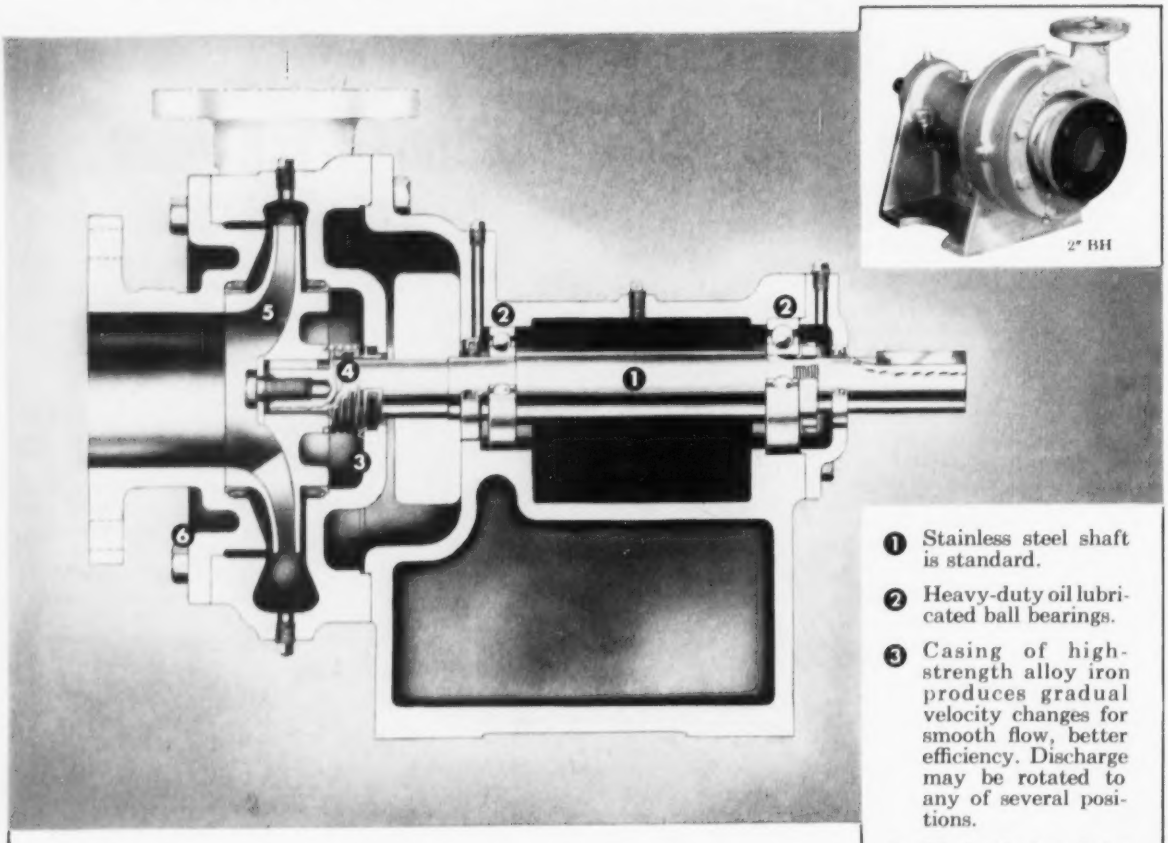
If you'd like the assistance of an International "Salt Specialist" on any problem concerning salt or brine—or further information on Storage Lixators—just contact your nearest International sales office.

International Salt Co., Scranton, Pa.

Sales Offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; and Richmond, Va.

FOR INDUSTRY, FARM, AND THE HOME—
STERLING SALT
PRODUCT OF INTERNATIONAL SALT CO., INC.

New high speed, high head centrifugal pumps ... the Gardner-Denver BH line



1. Stainless steel shaft is standard.
2. Heavy-duty oil lubricated ball bearings.
3. Casing of high-strength alloy iron produces gradual velocity changes for smooth flow, better efficiency. Discharge may be rotated to any of several positions.
4. Mechanical seal for long life without attention.
5. Hydraulically balanced bronze impeller.
6. Casing cover readily removed for impeller inspection.

Quality inside improves useful output

BH PUMP RATINGS

SIZE	HORSEPOWER	SPEED RANGE IN RPM	CAPACITY RANGE IN GPM
1"	1 to 10	1450 to 3460	55 to 150
1½"	1½ to 20	1450 to 3460	110 to 220
2"	2 to 25	1450 to 3460	170 to 440
3"	3 to 40	1450 to 3460	340 to 520

For complete information on these new Gardner-Denver BH centrifugal pumps, write for Bulletin 2-2e.

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

insect infestation. It is made of bleached sulfite paper mounted to foil with rough surface polyethylene extruded on the foil surface.

The polyethylene is especially treated so that paper-to-polyethylene glue seals can be made on the side and bottom, and heat sealed at the top.

Circle 28B on Reader Service Card

Can Carriers Boost Sales

A sharp jump in sales has been reported by Baltimore's Gunther Brewing Co. with the use of Can-Trak multiple carriers for its 16-oz. cans of beer.

Previously sold individually, the king-size quarts are now held together in fours by a one-piece panel carrier with side panels which flex around the top of each can.

The top of the panel provides space for a sales message. The short sides afford full visibility of the can labels.

Circle 31A on Reader Service Card

Trainload of Animal Crackers

A set of eight cartons—die cut and printed to look like railroad cars is being used by Schulze & Burch, Chicago bakers of animal graham crackers.

Printed in four colors, the cartons

HOPPER SCALES. For batching, charging, proportioning, filling, compounding and processing. Capacities from 500 to 120,000 lbs. For square, rectangular or cylindrical hoppers. Howe lever action assures rugged and accurate service.

TANK SCALES. For all types of tanks mounted vertically or horizontally. Simplified pipe lever system for supporting and weighing all tank loads from 500 pounds to 110 tons. Low corner mounting stands permit easy installation in areas with low ceilings or limited floor space.

WEIGHT CONTROL IS COST CONTROL

Fractions of pounds can be critical in cost and product quality.

Howe hopper and tank scales can give you rapid, accurate mixing and weighing of any group of materials. You can have any type of weight indication you choose—dials or Weightographs for direct readings, Mechanoprint recorders for printed weights, remote printers for centralized weighing, digital readouts and many other special types. And Howe understructures are the proud product of 100 years of skilled scalesmanship.

Additional scales—or better scales—might help your profit picture right now. Find out by talking to the man from Howe.

CENTENNIAL 100 YEARS 1857-1957

The HOWE SCALE Co

A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

RUTLAND • VERMONT

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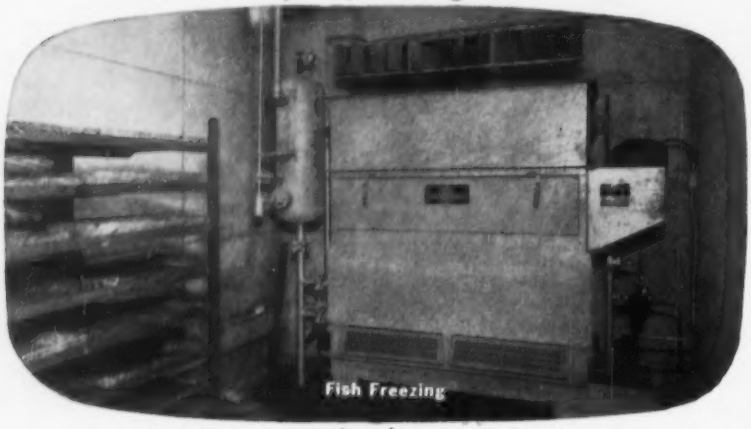
NIAGARA "NO FROST"

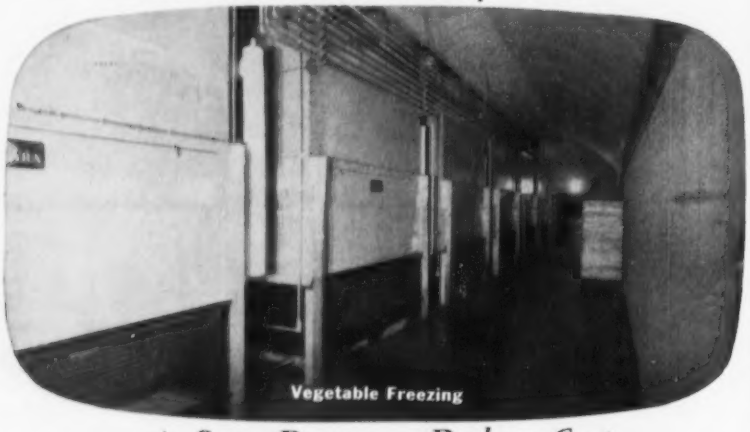
25 Years' Successful Experience

★ *Never any defrosting shutdown*



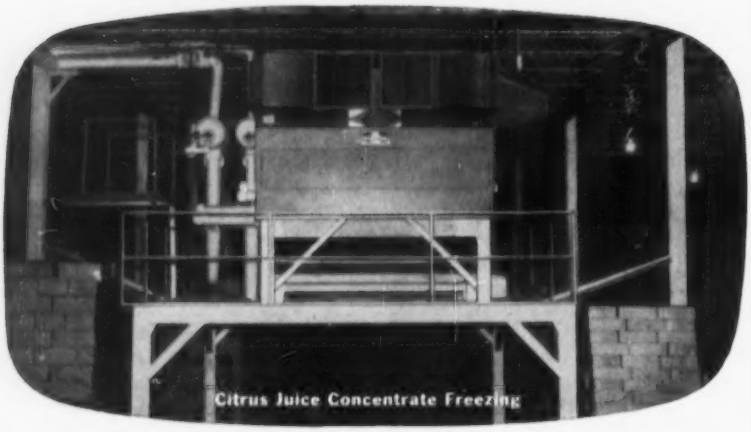
Fish Freezing

★ *Never a rise in temperature*



Vegetable Freezing

★ *Save Power . . . Reduce Costs*



Citrus Juice Concentrate Freezing

Write for Niagara Bulletin 105

NIAGARA BLOWER COMPANY

Dept. FI-8, 405 Lexington Ave. New York 17, N. Y.

District Engineers in Principal Cities of U. S. and Canada

Packages & Products

will appeal to children for its re-use value. The reverse-tuck permits removal of the crackers without damaging the carton.

Squeeze Tubes Go Outdoors

Two West Coast processors are using flexible polyethylene squeeze-tubes to package barbecue and picnic specialties.

Arden Farms, Los Angeles, is marketing a compact 8-oz. tube containing a cheddar spread called Squeez Cheez. A slotted opening allows the consumer to dispense the product in ribbons.

A garlic spread made by Garland Foods, Los Angeles, is a natural for outdoor cooking. Here, the mouth is wide and round for ease in dispensing.

Tube supplier is Bradley Container Corp.

Circle 32A on Reader Service Card

New Product Shorts

Orange Concentrate packaged in 6-oz. cans is newest product of Topco Assoc., Chicago.

Tunabergers, made of lightly smoked and sugar cured tuna loins are frozen and packed by Tuna Products Corp., Boston.

Rice in Bags is a product of Min-O-Matic Foods, Houston. Resembling large tea bags, the packages are sold three to a carton.

Garlic Stick, a cylinder of solid garlic essence and vegetable oils wrapped in foil, is distributed by Isrin Oliver Co.

Coffee Flavor has been added to the flavored drinking straws made by Flav-R-Straws, Inc.

Foil Bread Wrap has been adopted by Mead Bakeries, Inc., Amarillo, Texas.

Whether it's marshmallow, pie filling or batter for cakes or wafers...

Votator® CONTINUOUS PROCESSING EQUIPMENT

improves products and cuts costs

Girdler offers you 30 years' experience in these processes

Cooling	Crystallizing
Slush Freezing	Aerating
Cooking	Mixing
Enzyme Inactivation	Sterilizing
Chilling	Plasticizing
Pasteurizing	Whipping

to improve your production

Here's how: It's an efficient, closed processing system which makes possible precise control of temperatures, pressure and moisture content. Absolute uniformity of every pound of product produced by this high-speed method is the result.

Important, too, is the fact that the top-quality products produced by VOTATOR* Continuous Processing Equipment can be made at less cost! First, continuous processing means *labor costs are less.* Second, thorough mixing cuts baking time—*saves costly ingredients.* Third, the closed system *eliminates waste* through contamination. And fourth, it's compact—*less floor space* is needed.

Find out how you can make your product better at less cost with this equipment. Get in touch with Girdler—now.

*VOTATOR—Trade-Mark Reg. U. S. Pat. Off.

The GIRDLER Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY

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For more data, circle this page number on card at back →

Ole Sage Episode

What's Your Best Bet in Pension Plans?

IVAN C. MILLER
"Food Engineering"

EVEN BEFORE the Guff & Gripers were served their dessert and coffee, Batt Bulwark, works manager of Mull & Mull Co., was itching for the discussion to begin.

"Let's get underway!" he called to Ole Sage. "I want to hear those case histories showing how companies actually handle their problems of aging employees.

"Just one thing, though," he added as a waiter placed a wedge of pie in front of him: "If these case histories mean you got to bring up that business of 'vesting' again, then for gosh sakes tell us what it is."

"That's easy," explained Ole. "Vesting just means giving the employee title to part or all of the fund set aside toward his pension so that, at any time after the start of vesting, such amount belongs to the employee and will be paid to him or his heirs in the event of his permanent separation from the organization.

"Of course," Ole further explained, "whenever employees contribute from their earnings to their own pension fund, the total amount they have paid in at any time, with or without interest, is vested, and is always theirs in event they leave."

"Whatever else it may be," cut in Milt Sorenson, "such contributing by an employee is a kind of 'forced savings' which automatically provides some 'severance pay' for him if and when his employment is ended."

"Why isn't there more vesting?" Batt then demanded.

"I'll try to give you the perspective on that," replied Ole. Where there isnt any vesting, the termination of a worker's employment before he's retired means that whatever has been paid into the pension fund for him by the company remains in the fund, thus reducing overall pension costs."

"That's irony!" groaned Batt. "Bigger pensions to protect the union members from growing inflation caused by more wage increases forced by more unions!"

Ole paused to grin at Batt, then continued: "In places where the turnover is large—many employees coming and going—the cost to the company in payments into the pension fund is thus much lower than would be the case if any portion of the contributions were vested."

"Then I'll bet the unions go for vesting in a big way," Batt bellowed. "How about that, Ole?"

"So far, most unions—but not all—object to employee contributions to the pension fund. They insist, instead, that the company pay all. Generally, however, unions would prefer that members have vested rights to the contributions employers make into union-negotiated pension-plan funds."

"Aren't many unions demanding ever-increasing contributions," asked Si Worth of Zenith Canning Co., "so that pensions will be much larger—even double those considered liberal at present—in order to thus compensate for creeping inflation?"

Batt interrupted: "That's irony," he groaned. "Bigger pensions to protect union members from growing inflation caused by more wage increases forced by more unions!"

Ignoring Batt's jibe, Ole answered the question: "Si's right. Unions are trying to increase the amount of pensions to be paid to members. And this brings us to plans based on profit sharing—as a means of building larger retirement incomes for pensioned employees.

He went on: "As regards this specific sort of system for building adequate pension funds, a few food companies actually passed the experimental stage a long time ago."

"That's all a thing of the past," contended Batt. "Profit sharing is certainly 'out' for most companies today—because more and more of them are unionized, or will be. And as I understand it, the unions have always been against profit sharing."

"Mostly the unions were op-

HERE'S Quality YOU CAN SEE!

What could look purer than the sparkling white crystals of granulated sugar?

It has long been the custom to compare the color of granulated—*dry*—with liquid sugar. But true comparison can be made only when the granulated is dissolved. These photographs, of samples in 1000-milliliter beakers, show what can happen: the brilliant white granulated actually shows much more color than Flo-Sweet! The illustration at right shows the color of a mixture of *three* commercial granulated sugars.

What does this mean to you? Just this: You can get a good idea of the purity of a sugar by its color, since color is a fair indication of refinery efficiency.

With the current trend toward higher and higher quality in food products, only the best ingredients are good enough for the discriminating food producer. Whether you judge quality on the basis of color, taste, or laboratory analysis—we urge you to compare Flo-Sweet quality with any other sugar, liquid or granulated.

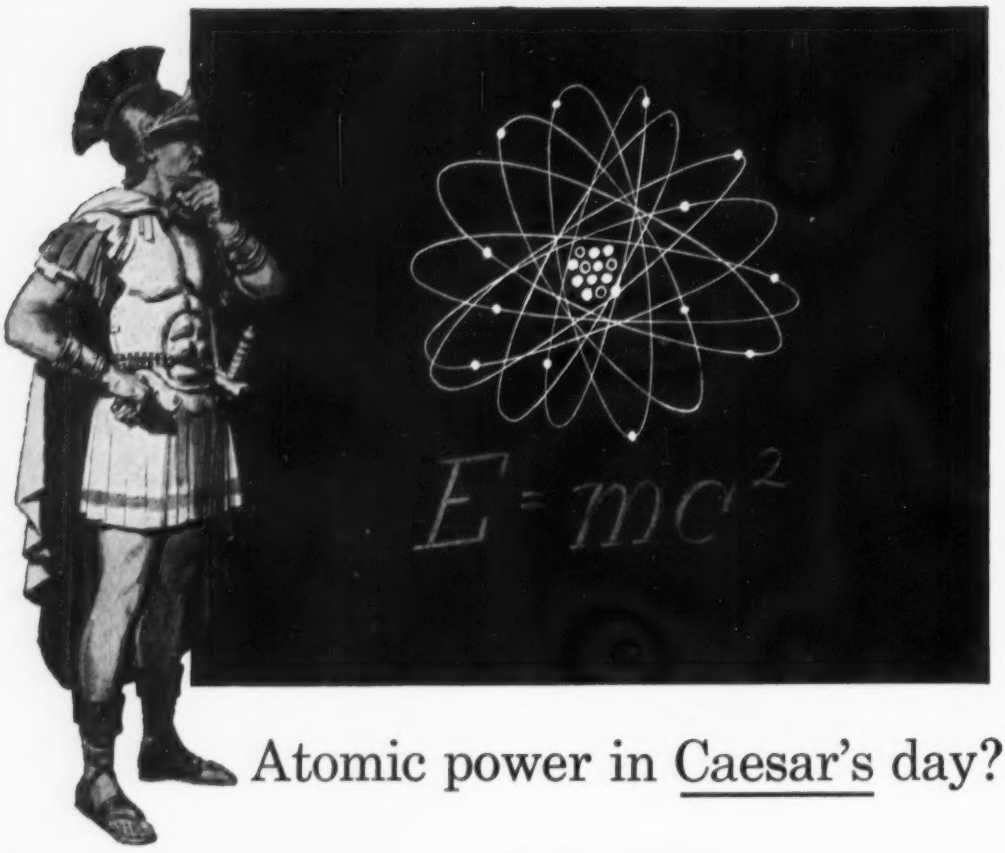
For here's true sugar quality . . . quality you can *see!*

REFINED SYRUPS & SUGARS, INC.

YONKERS, NEW YORK

FLO-SWEET
FIRST IN LIQUID SUGAR

SERVING INDUSTRIAL SUGAR USERS EXCLUSIVELY FROM YONKERS · ALLENTOWN · DETROIT · TOLEDO



Atomic power in Caesar's day?

Certainly!

It was there, in the ground, in the air and water. It always had been. There are no more "raw materials" today than there were when Rome ruled the world.

The only thing new is knowledge . . . knowledge of how to get at and rearrange raw materials. Every invention of modern times was "available" to Rameses, Caesar, Charlemagne.

In this sense, then, we have available *today* in existing raw materials the inventions that can make our lives longer, happier, and inconceivably easier. We need only *knowledge* to bring them into reality.

Could there possibly be a better argument for the strengthening of our *sources* of knowledge—our colleges and universities? Can we possibly deny that the welfare, progress—indeed the very *fate*—of our nation depends on the quality of knowledge generated and transmitted by these institutions of higher learning?

It is almost unbelievable that a society such as ours, which has profited so vastly from an accelerated accumulation of knowledge, should allow anything to threaten the wellsprings of our learning.

Yet this is the case

The crisis that confronts our colleges today threatens to weaken seriously their ability to produce the kind of graduates who can assimilate and carry forward our rich heritage of learning.

The crisis is composed of several elements: a salary scale that is driving away from teaching the kind of mind *most qualified* to teach; overcrowded classrooms; and a mounting pressure for enrollment that will *double* by 1967.

In a very real sense our personal and national progress depends on our colleges. They *must* have our aid.

Help the colleges or universities of your choice. Help them plan for stronger faculties and expansion. The returns will be greater than you think.

If you want to know what the college crisis means to you, write for a free booklet to: HIGHER EDUCATION, Box 36, Times Square Station, New York 36, New York.

PUBLIC SERVICE ADVERTISING COUNCIL

Sponsored as a public service, in cooperation with the Council for Financial Aid to Education

posed," admitted Ole. "But recently many have reversed themselves, some even demanding in their bargaining a share of profits for the employees they represent."

"Let's get back on the track," blurted Batt. "What we've been talking about may help improve the lot of those who will be retired on pension. But so far we have had no case history showing how a food company with a pension plan has met the problem of profitably employing those who have reached 40 or those who are older."

"Well, some of you," came back Ole, "may have heard of the 'Toledo Experiment' in vesting."

When several of the men around the table shook their heads, Ole explained: "In that Ohio area, one union negotiated a vested pension contract with some 30 or more companies, all engaged in the same type industry. According to that contract, when a worker was laid off by one company and then hired by another company in the group, his pension fund built up in the first company was then transferred intact to the second. Thus, little if any increase in pension payment was required of the second company because of the man's advancement in age."

Ole glanced around the table to be sure of comprehension, then added: "The pension fund was, in fact, a common pool via insurance for all participating companies."

He continued: "Granted, that case wasn't in the food field. But I understand a similar contract has recently been negotiated on an 'industry-area' basis in the Metropolitan Philadelphia area – where various unions bargain with groups or 'associations' of meat packers, bakeries, dairies, confectioners, etc. relative to the negotiating of contracts."

Ole paused, searched his pockets, then went on: "I thought I had a note on the subject, but I don't find it. Nevertheless, I recall that this vested plan in Philadelphia permits a worker to carry his pension fund accumulation with him from one company in the area to another. From memory I would say it was the candy and confection manufacturers in that area and the local bakery and confectionery union."

"Ole, do you think that such a type of pension plan is likely to spread in the food industry?" asked Milt.

"There is more probability in the food industry," predicted Ole, "than most, particularly where there already is industry-area bargaining. However, at this point we can't consider this one case as much more than an experiment."

Batt was in a badgering mood: "Do you know of a *single* case, Ole, that can be considered in any way *beyond* experimental?"

"Yes, I know of one that has been in operation long enough to be stamped successful," Ole assured them. "I first read about it back in the August 1949 issue of *Food Industries.*

"Give us the lowdown, Ole," suggested Batt. "Whose plan are you talking about?"

"The one I refer to was negotiated at the Lehigh Valley Dairy—by the Employees Independent Union and the company. It was approved and adopted in December of 1948.

"And personally, I like this plan—because the employees pay into it monthly, and as a result know the cost of pensions. To them it's not like getting something for nothing.

"In short, each employee in that company learns and understands not only that he pays in advance for security in the less productive years of his old age, but also that he doesn't carry the load alone. More than half of the burden is the dairy's share in cooperation.

"The employee's investment is always his own property—vested as soon as he's been there a month and protected by a fund in trust, payable in full to him or heirs should he leave the company.

"Retirement is at age 60, whereupon the pension pay is $4 per month for every year the employee has worked for the organization, up to a maximum of $100 per month. What's more, an employee reaching retirement age may elect either to stop work or to continue at his job drawing wage or salary and also retirement pay as well. If he hasn't been with the company for 25 years, then each extra year he continues to work adds $4 per month to the amount of his retirement pay until it reaches the aforesaid maximum of $100 per month."

"You kidding?" demanded Batt. "A retirement-age guy can actually go on working and drawing both his pay and his pension, too?"

"Yes, Batt. Unusual though it is, it's true. Back in January of '49, when the plan went into effect, 7 employees automatically went on retirement pay, yet all of them continued to work and receive both wage and pension. And when we checked just last month, we found 15 employees were drawing pensions, 13 of them continuing to work at their regular union wages.

". . . He can draw his wage or salary—and his retirement pay as well!"

"Each month", Ole went on, "the amount due for pension payments, plus operating expenses, is determined. Employees are assessed an amount to cover the current month's expense, by payroll deduction. And in a special fund management puts an amount equal to the total payments of the employees.

"This continues until the fund reaches a stipulated amount, at which level it is maintained. Thereafter, management's contribution goes to share the actual cost of the plan—meeting labor's assessment on a 50-50 basis.

"When an employee's service is terminated, whether by management or by the individual himself, the worker is reimbursed for the full amount he has been assessed to support the pension plan. Should he die after he is 60 years of age and before the amount paid him in pensions equals the total of his past assessments, the difference is paid to his heirs. All such payments are met by drawing on the special fund.

"Funds for the operation of the pension plan are administered cooperatively by a board of six members, three elected annually by the employees' union, three appointed by management."

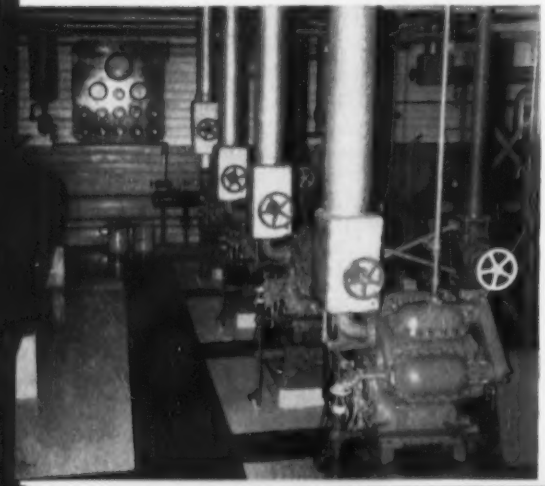
Batt laughed heartily. "I can well understand why Ole likes that plan. Even I like it."

"It does make sense," volunteered Si Worth. "I never could believe that people put the true value on anything if they get it for nothing—or even if it seems they get it for nothing."

"Si's 'seconding of the motion' is good enough for me," said Batt. "And now, what do you say we call it quits on the old age problem and open fire on something else next trip?"

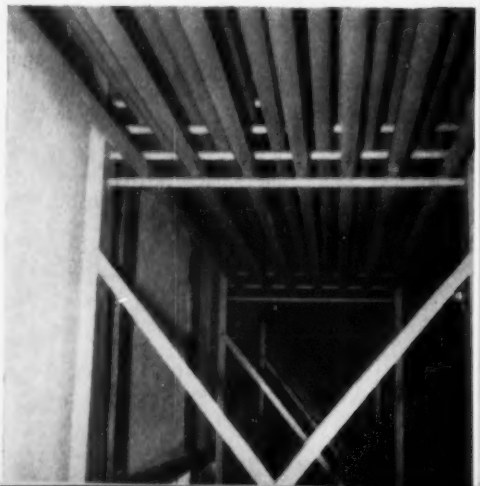
Nods from the other G&G'ers indicated unanimous backing for this idea. And with that, the meeting broke up.

WORLD'S LARGEST GRAPE STORAGE installation, Elmco Cold Storage Company's Porterville, California, plant is refrigerated by York system: Cooled grapes ready for shipment are surveyed by York's Warren Ludwig, Elmco's General Manager, Wilfred Rusconi. Plant's capacity is equivalent of 500 railroad cars.



FOUR 60 HP YORK VW COMPRESSORS cool 5 grape storage rooms totalling more than 780,000 cubic feet plus runway loading area. Plant is equipped to load 16 railroad cars simultaneously.

78,000 FEET of 1¼ inch steel coils circulate coolant to protect packaged grapes while they are awaiting shipment. Coils are coated with vinyl to eliminate corrosion.



YORK® PRIOR PLANNING SERVICE controls refrigeration costs by early analysis of system needs

- Major tasks assigned to today's refrigeration require major system expenditures.
- Thus, it is essential that the system incorporate its own safeguards for performance, accuracy, reliability, long life — without being over-engineered.
- York's 5-point PRIOR PLANNING SERVICE assures precise technical data on system needs early in the planning stages to help you, your consultants design a better system without costly changes later on.

No two refrigeration systems are exactly alike. The conditions vary, the job to be done varies, even the speed in which the same job is to be done often varies. Through Prior Planning Service, the York engineer can help owner, contractor, consultant on *any* refrigeration problem. By calling on his vast experience and training in refrigeration, he can provide a thorough and accurate analysis of system requirements, determine the exact characteristic of the variables which affect system design, including:

- **ambient conditions**
- **cooling rate**
- **constant or variable loads**
- **quantity of water**
- **lowest temperature required**
- **power source**
- **location of engine room**

Armed with this information, it is then possible to design a system that will meet the needs precisely, provide insurance against product spoilage or production downtime, allow for expansion without requiring an over-investment.

Through Prior Planning Service, the York sales engineer brings to your refrigeration problem unparalleled experience. York refrigeration system installations include the gigantic environmental laboratory for U. S. Navy, Trenton; Sunkist's Exchange Lemon Products Company, California; Carling Brewery, Natick, Mass.; Lehigh Valley Cooperative Farmers milk plant, Allentown, Pa.

You may rely with complete confidence upon the good judgment and recommendations of the York engineer. Call him *early* in your planning, or write York Corporation, subsidiary of Borg-Warner Corporation, York, Pennsylvania. In Canada, Canadian Ice Machine Co., Toronto.

PRIOR PLANNING SERVICE works 5 ways

1. **EARLY ANALYSIS** gives you all the technical data needed to make decisions.
2. **PROPER SELECTION OF EQUIPMENT.** York supplies *all* types, can be objective in recommending the equipment that is right for the job.
3. **BEST USE OF TIME, MATERIALS.** York can help the engineers, contractors and consultants on space, design specification problems, avoid costly changes later.
4. **INSTALLATION SUPERVISION.** When desired, York supervises system installation, tests and adjusts it, trains operators on how to utilize all of its outstanding capabilities.
5. **MAINTENANCE SERVICE.** When you specify York, a York Certified Maintenance Contract can also be specified assuring regular system inspection, 24-hour emergency service, all repairs, complete reports on the system's conditions.

York refrigeration air conditioning ®

the quality name in refrigeration

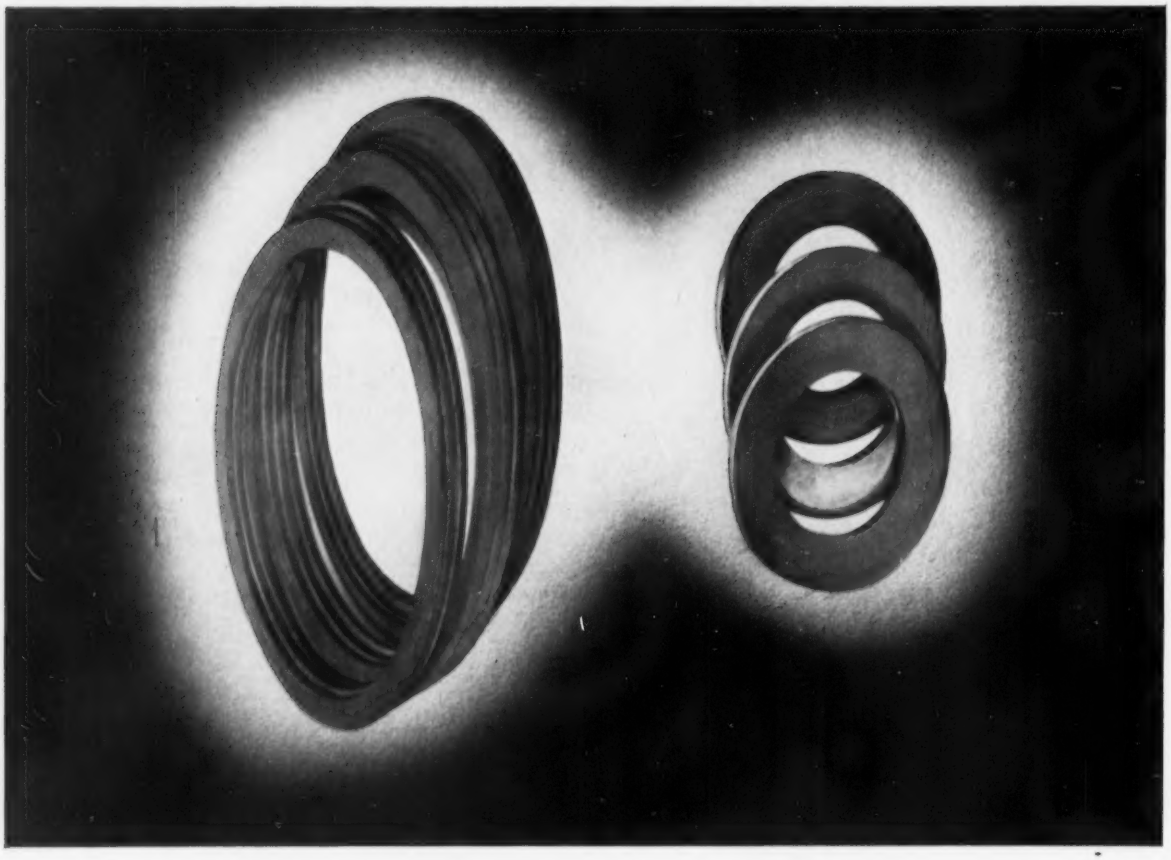
YORK B-W

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

YORK CORPORATION

SUBSIDIARY OF BORG-WARNER CORPORATION

Non-toxic Gaskets at non-toxic Prices...



U. S. low-cost Gaskets—lead- and zinc-free!

These gaskets are cured without commonly-used lead or zinc—and are therefore free of any toxic elements. Rubber is the only material that combines maximum flexibility and resiliency. And these gaskets, being all rubber, have a flexibility, resiliency *and durability* approached only in high-priced packings made of other materials.

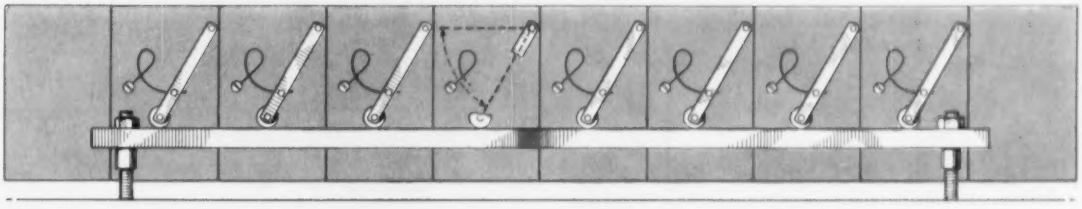
These non-toxic, low-cost gaskets, cured specially for the food industry, are available at any of the 28 "U. S." District Sales Offices, or write United States Rubber, Mechanical Goods Division, Rockefeller Center, New York 20, New York.

Mechanical Goods Division

United States Rubber

CUT OUT AND FILE

PRACTICAL IDEAS



Way to Up Filler Versatility, Improve Weight Control

Speedy change-over of a candy packaging unit was our goal when we designed this simple device, but we also gained closer tolerance on filling weights.

In our filling machine, candies (such as chocolate covered raisins) are filled through pockets into portion-sized boxes. Because densities were not the same on different types of candies, each one had its own set of filling pockets. This insured that the weight delivered to each box was as stated on the label.

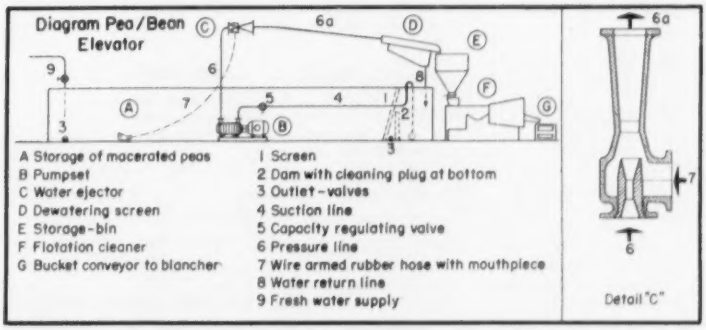
The trouble was that changing a set of pockets required shutting the unit down for an hour. This was wasted time for most of the packaging department.

Now, however, we use one set of pockets and these are adjusted for different candies while the machine is running. A movable vane (see sketch) in each pocket governs amount of candy dropped into each box.

The vanes are pivoted on small pins set in bearings drilled in the pocket walls. Outside of the pockets, short bars are fastened to the pins. And piano-wire loops exert constant pressure on the bars forcing them toward the vertical position. Since the bar and vane both turn on the same shaft, the vane is also tipped to a more open setting.

However, the lower end of the shaft rides on a horizontal track that extends the length of the pocket-filling part of the machine. The track limits the movement of the bar, and, by adjusting its height, capacity of pockets can be controlled. This is accomplished by two screws, one at each end of the bar. Markings made for each type of candy packed facilitate setting the track to the proper height with a minimum of extra adjustment.

Not only can the track be adjusted while the filler is running, but the overfill tolerance can be set to within 2/64-3/64 oz. Formerly, with the individual sets of pockets the weights usually ran about ¼ oz. over.—*V. Burger, Mechanic, Blumenthal Bros. Chocolate Co., Philadelphia.*



Waterjet-Elevator Discharges Product

Some of our products require macerating for about 12 hr. before blanching. Such products include peas and beans for packing in tomato sauce, and marrow-fats among others.

To gain more volume for storing during the macerating period we took over two large reinforced concrete tanks having spinach-washing reels.

This increased our capacity by 200%, but it was impossible to discharge the peas in a normal way. Because of the reels a man could not stand in the basin to scoop the peas out, and pumping caused too much product damage.

Here's how we finally got the peas out and, at the same time, gave them a rinse and achieved labor benefits.

A 12 hp., 1400 rpm. centrifugal pump (B in sketch) was installed near the basins (A). A waterjet-elevator (C) was built into the pressure line (6). A wire-reinforcement rubber hose with a big "vacuum-cleaner" mouth piece (7) sucks the peas out of the basins. Peas are transported to the blancher via the dewatering screen (D), storage tank

Insure Uniform Quality Cooking

DOUBLE-CHECK with COOK-CHEX

When a Cook-Chex is attached to a retort basket . . . *Anyone* in your plant can double check, at a glance, *two important* facts!

1. **The basket has, or has not, been through the cooking process.**
2. **It has, or has not, been subjected to *proper* cooking conditions.**

These two facts are important to you because they eliminate the usual problems of: a wrong cook schedule, keeping baskets in sequence, and the possibility of "losing" uncooked baskets!

Easy-to-use Cook-Chex signal these essential facts automatically! Cook-Chex, produced with a *purple* chemical ink, turn color to *green* only after your proper cooking conditions have been achieved. Cook-Chex react to precise conditions of temperature, steam and time; and, may be ordered to meet your specific cooking requirements.

Cook-Chex are also excellent as a low cost, permanent record for your cooking-room operations.

Double-check with Cook-Chex to insure uniform quality in your food products. Send for supply of Cook-Chex samples.

ATI COOK·CHEX

Another product by ASEPTIC-THERMO INDICATOR COMPANY

Aseptic-Thermo Indicator Company
11471 Vanowen St., North Hollywood, Calif. FE-8

Please send a FREE supply of Cook-Chex for use with a cooking process of _____ degrees F., for _____ minutes.

Name _____

Position _____

Company _____

Address _____

City _____ Zone _____ State _____

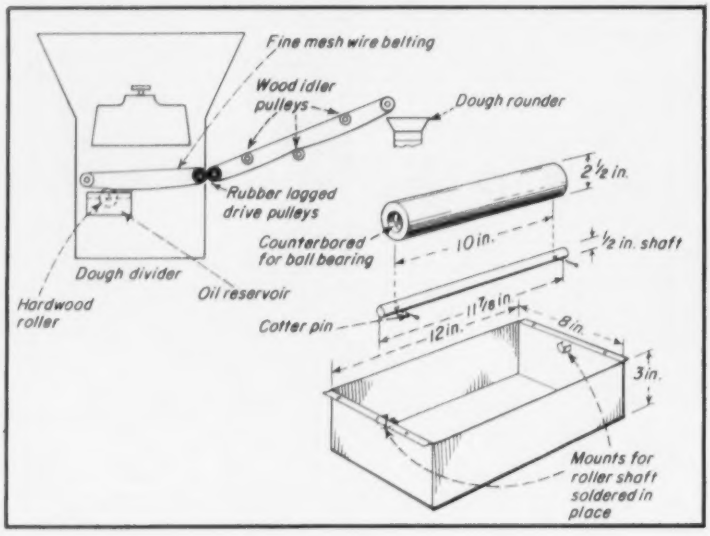
Practical Ideas

(E), flotation cleaner (F), and bucket-conveyor (G).

Inlet of the waterjet (6) is 3¼ in. dia., outlet (6a) is 4 in., and inlet (7) is 4 in. Its capacity is 3 tons per hr. of macerated peas and we get no damaged ones. Moreover, they get a thorough rinse before entering the flotation cleaner.

But look at this big bonus value the new system brought us. Formerly we used four operators, two for scooping, one for transporting, and one for blanching. Now one man handles the hose, pump, flotation cleaner, and blancher.

Water-level can be adjusted to conform to the decreasing pea-level by means of outlet valve (3) behind screen (1). And suction-line (4) never runs dry because of built-in well (2).—*W. H. Fortuin, General Manager, N. V. v/h W. Hoogenstraaten & Co., Alkmaar, Holland.*



No Dusting Flour Needed On This Dough Conveyor

Here's a dough conveying system that is saving us $6.00 a day on dusting flour.

We replaced the canvas conveyor that runs between our dough divider and rounder with Cambridge fine mesh wire belting. This new conveyor picks up a fine film of divider oil from a wooden roller. Oil prevents dough from sticking to belt.

The job also involves lagging the steel drive pulleys with neoprene to give better traction for mesh belting.

But the secret of the whole op-

CAN YOU USE $50?

Then here's an opportunity to get it.

Send one of your ideas to FOOD ENGINEERING.

Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in ten.

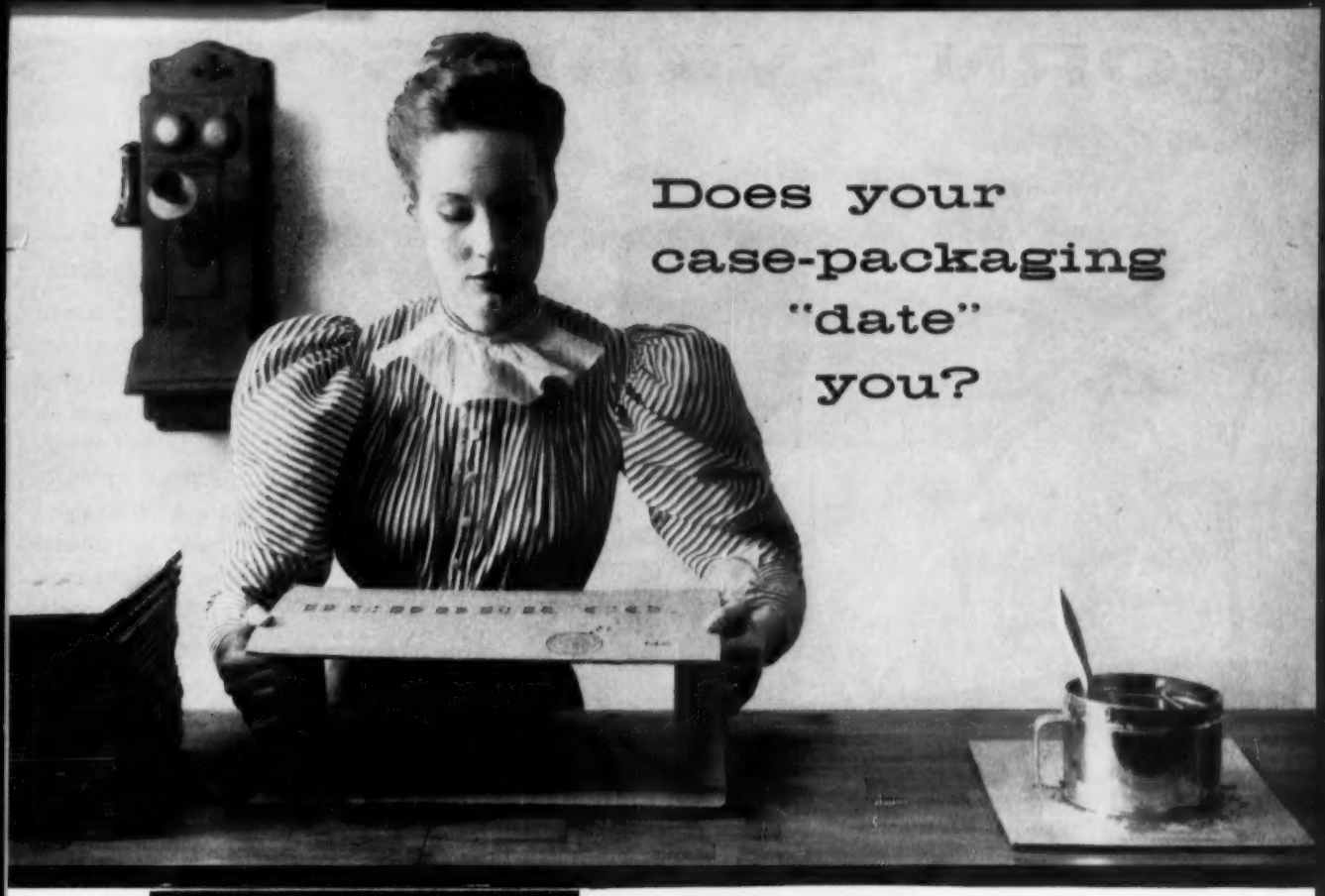
Also $5 to $15 (sometimes even more) is paid for each contributed item used. So a few minutes time may net you as high as $65.

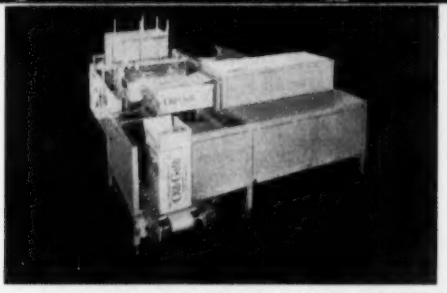
Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.

We'll do the finished writing and drawing for you.

Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y. —The Editors.

MAY PRACTICAL IDEA WINNER was "Cuts Corners to Save Trays," submitted by Nick Crnobrna, Foreman, Armour & Co., South St. Paul, Minn. (Winners are chosen by Readex, a foremost outside survey agency that regularly polls many scores of FE readers throughout the country.)





FEEDER-FORMER-POSITIONER-LOADER-UPENDER

This machine in operation at the P. Lorillard Co. automatically end-loads regular and kingsize cartons of Old Golds at the rate of 400 cartons per minute (60 cartons per case in a 2x5x6 pattern) or nearly 5 million smokes an hour. A high-speed machine which forms cases, positions and loads fully-automatically can be the answer to your packaging line. Write us for consultation or for additional information and prices.

J. L. FERGUSON CO. Joliet 10, Ill.

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PACKOMATIC machines include the Bale Sealer — Case Sealers — Opener-Loaders — Case Imprinters — Telescoping Volumetric Filler — Packer-Gluers. Units available, semi-automatic or fully-automatic depending on your needs.

Packomatic

T.M. Reg. U. S. Pat. Off.

equipment feeds, forms, positions, loads, seals, and imprints shipping containers automatically

From the time the magazine is stacked with "knocked-down" containers until they are loaded, sealed and imprinted, ready for shipment—not a human hand is required. Here's automatic, foolproof equipment Custom-Engineered to do the whole job—or any part of it for less—and at a speed to match any production line. End-loading techniques save up to 28% on paper board costs alone. Labor savings are obvious. And, Packomatic Custom-Engineered equipment can do the trick for virtually any product; witness the case loading patterns below. Whatever your requirements, whatever your budget, there's a Packomatic machine to cut costs and boost production in your plant.

Six 5-qt. cans or gallon cans in 20⅛" x 13⅜" x 9 3/16" case and 20¼" x 13¾" x 8¼" case

Twelve 46 oz. cans in 21" x 13" x 7⅛" case

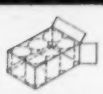
Twenty-four cartons in 12½" x 10⅝" x 8½" case

Eighteen 7 & 8 oz. cartons in 20" x 14⅛" x 8⅝" case

Sixty cigarette cartons
King Size: 17⅞" x 11½" x 22"
Regular: 14 5/16" x 11½" x 22"

TYPICAL CASE LOADING PATTERNS FOR CANS AND CARTONS

Twenty-four 12 oz. cans in 16⅜" x 10 5/16" x 5 5/16" case



Six No. 10 cans in 22 1/16" x 17⅜" x 7⅛" case

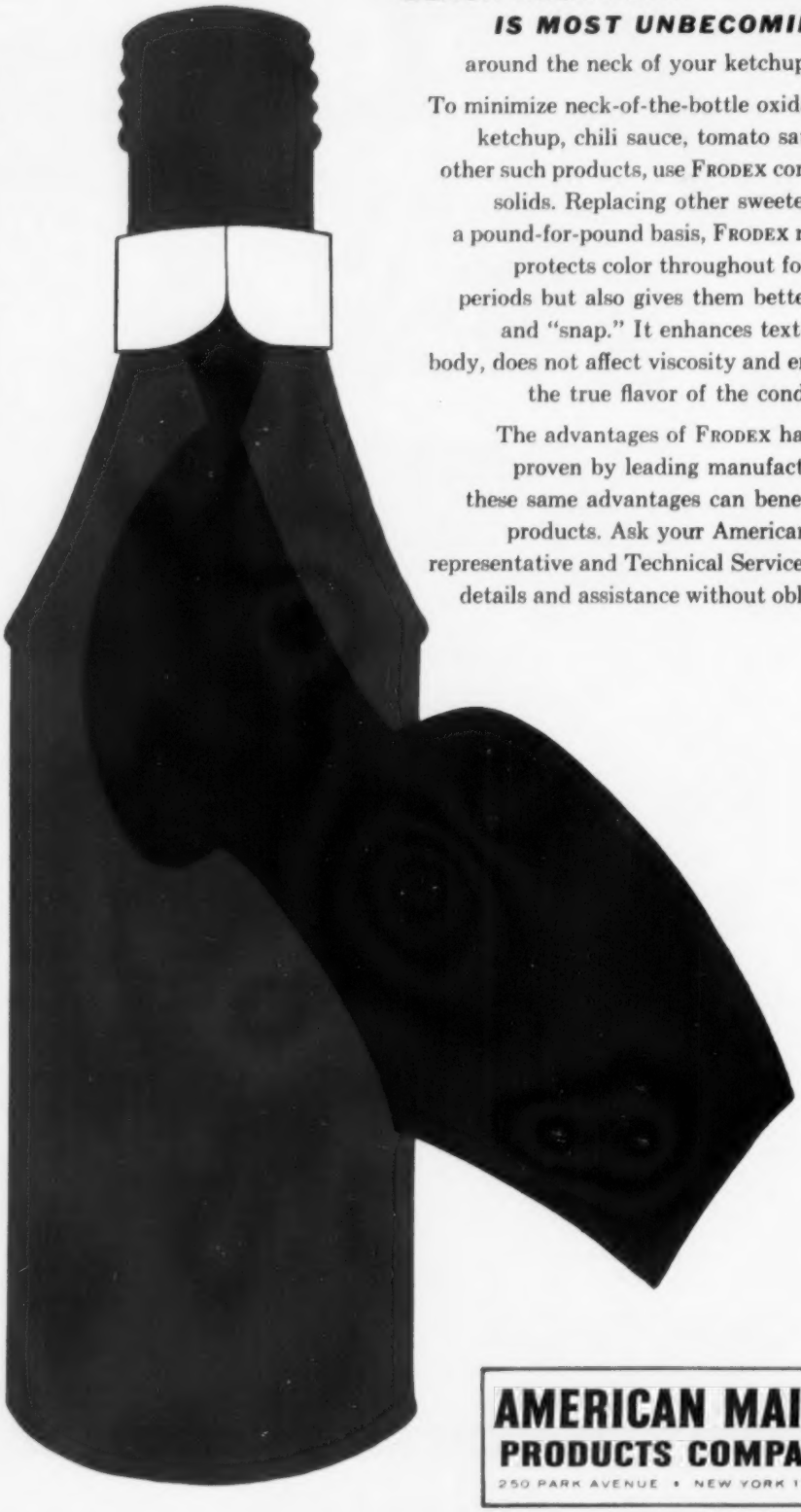
Thirty 1 lb. cartons in 16⅛" x 10 5/16" x 7¼" case

Twenty-four cartons in 19½" x 10⅞" x 7" case

Forty-eight cartons in 22¾" x 23½" x 15⅞" case

CORN SYRUP SOLIDS

FRODEX



BLACK NECKWEAR IS MOST UNBECOMING...

around the neck of your ketchup bottle.

To minimize neck-of-the-bottle oxidation in ketchup, chili sauce, tomato sauce and other such products, use FRODEX corn syrup solids. Replacing other sweeteners on a pound-for-pound basis, FRODEX not only protects color throughout for longer periods but also gives them better sheen and "snap." It enhances texture and body, does not affect viscosity and enhances the true flavor of the condiments.

The advantages of FRODEX have been proven by leading manufacturers – these same advantages can benefit your products. Ask your American Maize representative and Technical Service for full details and assistance without obligation.

AMERICAN MAIZE-PRODUCTS COMPANY

250 PARK AVENUE • NEW YORK 17, N. Y.

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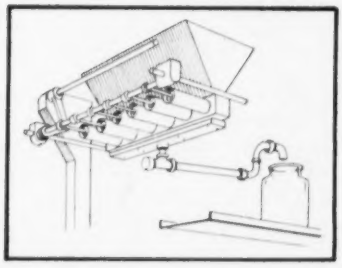
MEMPHIS · PHILADELPHIA · PITTSBURGH · PORTLAND · ST. LOUIS · ST. PAUL · SAN FRANCISCO · SEATTLE

eration is the divider oil reservoir and wooden roller mounted under the mesh belting on the divider (see sketch). These have to be made to suit the individual application. After trying several types, we found that a roller made of hardwood worked best for high speed application.—*Stanley Rinaldo, Maintenance Superintendent, Jamestown Baking Co., Jamestown, N. Y.*



Filler Now Takes Gallons

When we expanded our salad dressing line to include 1-gal. jugs, we encountered a filling problem.

Though the 6-spout plunger-type filler employed on our dressing line could be adjusted to fill several sizes of small containers, the 1-gal. fill was beyond the capacity of a spout.

We then constructed a manifold (see sketch) to span the outlets of all six plungers, with a pipe attachment to deliver product to gallon jugs on a separate conveyor line.

Next, the travel of the plungers was adjusted, by trial and errror, until the discharge of exactly 1 gal. was obtained.

The manifold is easily detached for cleaning or for re-converting the unit to fill six jars of small size. —*C. D. Fulton, Plant Engineer, Old Dutch Foods, Inc., Blasdell, N. Y.*

Making Tractors Versatile

Some plants employ a single tractor to do a variety of yard jobs. A broom may be attached to the front to sweep-up concrete aprons

THE MULTI-MILLION DOLLAR QUESTION . . .

Ask SARGENT

Whether this all-important question is settled in Sargent's Laboratory or in your own, Sargent Dryers for food processing are guaranteed to deliver the product dried accurately, carefully, to the exact degree of moisture content desired.

For rice, cocoa, coffee, cranberries, nuts, fruits, cereals, berries, vegetables and other food products — even bird seed! — and wherever natural flavor, color, form and quality are a must, Sargent Dryers and Sargent Coolers are best for the job.

They are unusually rugged and dependable. Designed for easiest cleaning, for economical maintenance and operation — there are no hidden or hard-to-reach areas in Sargent Dryers! Built in any length, width, capacity. Economical of space, stainless steel throughout as required, performance-proven and guaranteed, every Sargent Dryer and Cooler is designed for your particular product, your process, your production.

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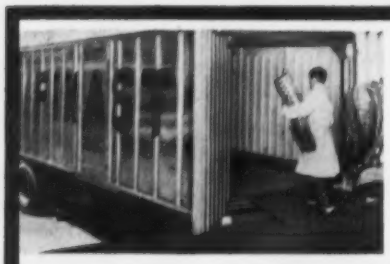

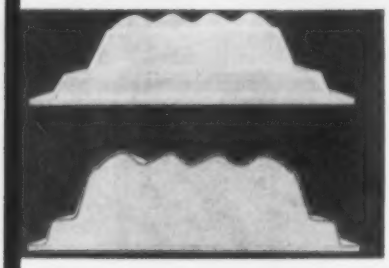

Typical cross section of Lami-Plast refrigerator door. The door pan is vacuum formed of thermoplastic, the door facing is of fiber glass reinforced polyester Lamicor. Insulation is closed cell non-moisture absorbing chemical foam. Note that foam insulation completely fills the void between door facing and pan giving uniform insulation and greater impact resistance to the door pan.

STRICK PLASTICS
INTRODUCES LAMI-PLAST
The first All Plastic Refrigerator Door

- Lightweight
- Longer Service Life Reduces Cost
- Resists Corrosion, Rust, Rot and Warping
- Maintains constant K-factor for life of door

Now for the first time the Lami-Plast refrigerator door overcomes all the basic disadvantages of conventional refrigerator doors. Its lighter weight eliminates the need for oversize hardware. The Lami-Plast door is dimensionally stable under all extremes of temperature, will not warp even in the presence of extreme dampness. The all plastic construction eliminates wood and wood to metal joints which are sources of heat transfer, giving uniform insulation over the whole door area. The Lami-Plast door will not rot, rust or corrode and the smooth plastic skin will not mark meat on contact and is easily cleaned.

Low Initial Cost Plus
Long Service Life Reflect Savings

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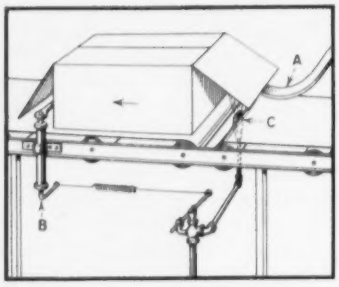
and streets within a plant area, or a grass cutter may be hooked up to mow lawns, or a blade may be mounted to level off gravel areas by scraping.

In a specific case involving one food plant too much time and labor were involved in switching over from one operation to another. Difficulty, in this case, centered on removing two 30-gal. water drums saddled at front drive wheel in the center of the tractor. Water was piped from drums to spray nozzles above a 2½x6-ft. rotary bristle-type brush to wet it down and contain the dust while sweeping.

Job is now simplified through installation of a rear-mounted platform (photo) supporting a 55-gal. water drum. Operator no longer has to remove drums to take off the rotary brush. What's more, there are fewer bolts and they are easier to get at. And there's only one ¼-in. hose line to hook up to the pump feeding water to the brush.—*FE Staff.*



Jet Solves Sealer Problem

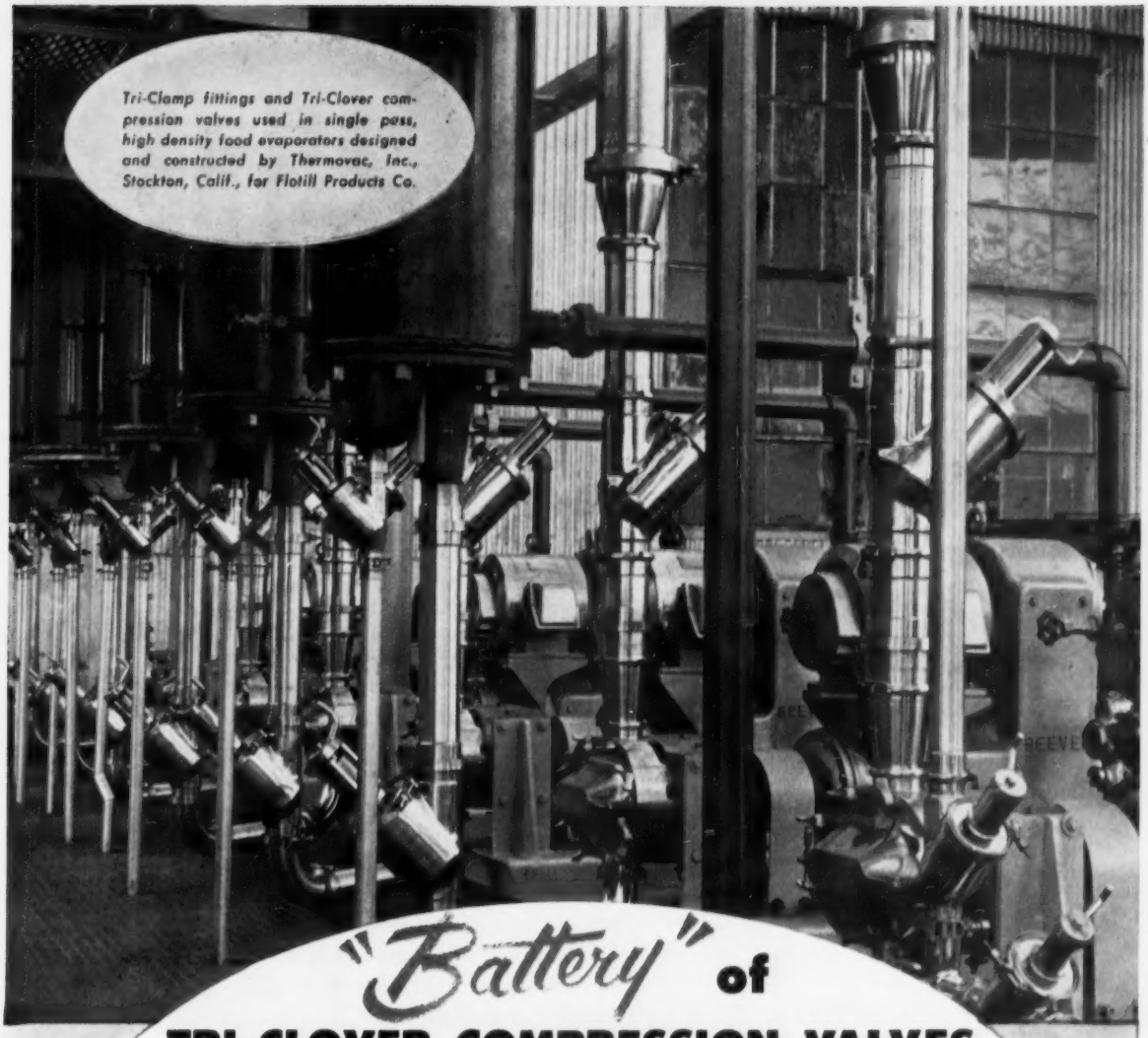
A simple air system costing less than $35 took the place of a man on our corrugated carton line.

With the type of carton sealer we have, a man was needed to make sure that the rotating arm of sealing mechanism (A in sketch) had a "bite" on the edge of the carton flap.

Now this man has been put to work elsewhere in the plant. His job is being done by an air jet.

As each carton moves down the line, from the carton filler, it pushes aside a bar (B) we installed. This actuates a solenoid, opening an air valve, and allowing a blast of air to pass from the plant supply through a nozzle (C) directed at the underside of the carton flap.

The rotating arm on our sealer now grabs each carton flap because the air blows the flaps up away from



Tri-Clamp fittings and Tri-Clover compression valves used in single pass, high density food evaporators designed and constructed by Thermovac, Inc., Stockton, Calif., for Flotill Products Co.

"Battery" of TRI-CLOVER COMPRESSION VALVES

connected with TRI-CLAMP® Sanitary Fittings make compact—easy to clean installation at West Coast Cannery

This view is an excellent example of the way in which Tri-Clover Division's Tri-Clamp fittings and unions simplify and save space on what otherwise might be an extremely complex, hard to install, hard to clean piping and equipment arrangement. In this case, the Tri-Clamp fittings connect a large "battery" of Tri-Clover compression valves . . . one of the many types of sparkling-clean stainless steel valves and fittings used by food processors from coast to coast.

For stainless steel corrosion-resistant fittings, valves, pumps and tubing to protect against product contamination, be sure to specify TRI-CLOVER . . . the Mark of Quality.

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- Easy to install
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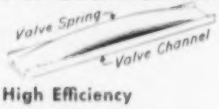
- No freezing problem
- Air cooled intercooler
- Constant speed or dual control
- I-R Channel Valves

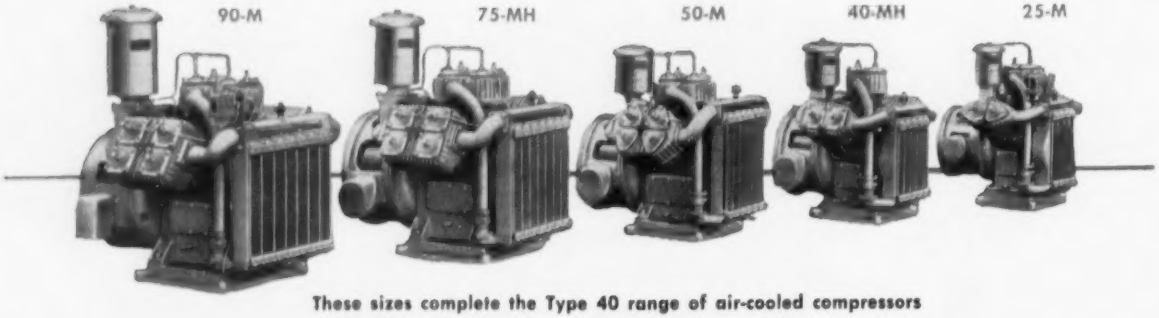


High Efficiency
Quiet Operating
Exceptional Durability
Entirely Different
Stainless-steel Channels and Springs
Air-cushioned action
Found only on I-R compressors

Newest addition to the Ingersoll-Rand line of Type 40 compressors, this heavy-duty, air-cooled unit offers new convenience and economy for the generation of 80-125 psi air power in the 125 hp class. Shipped fully assembled, its compact, well-balanced design and small foundation requirements cut installation costs. And efficient two-stage compression with intercooling to near ambient temperature, reduces power costs all year around.

Choice of constant-speed control, automatic start-and-stop control and manual or automatic dual control affords the most efficient capacity regulation for your particular operating requirements.

For complete information on all the time-saving, cost-saving features of this 125-hp Motorcompressor, send today for your copy of Bulletin 3188.



These sizes complete the Type 40 range of air-cooled compressors

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ROCK DRILLS • PUMPS
TURBO-BLOWERS • AIR AND ELECTRIC TOOLS

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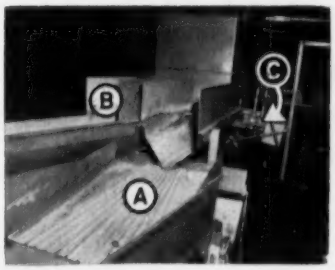
the sides of the cartons. And the only parts that we needed were a 110v. solenoid coil, an Allen-Bradley switch, and some pipe.—*F. Rockel, Plant Engineer, Kirsch Beverage Co., Brooklyn, N. Y.*



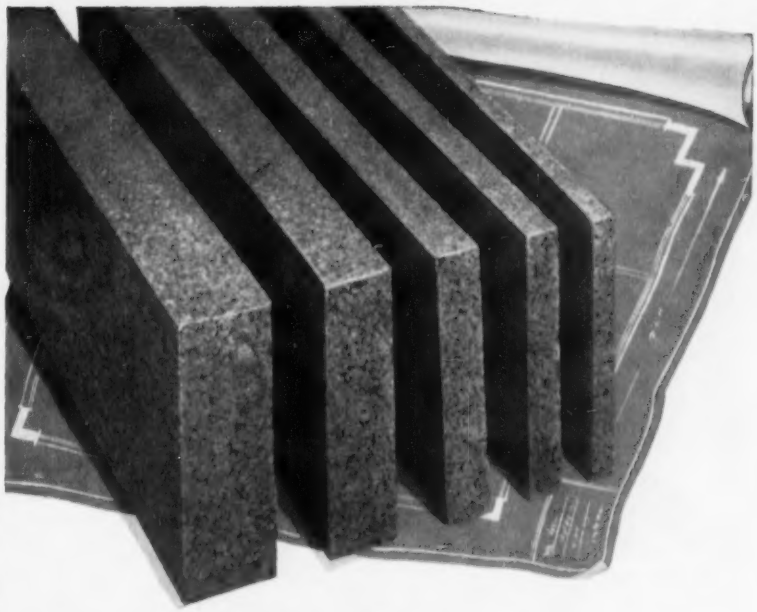
Splits Flow Between Flumes

Peas or lima beans enter our plant through one flume and are then run to a bulk freezer (York Corp.) or filling unit (Marfak). Grade and quantity requirements of our product as well as maximum production rates of the filler and freezer determine whether one or the other or both units will be fed.

Also, the flumes are mounted too high for convenient hand regulating from the floor. Ladders would be needed for this.

Often we want to keep the packaging unit going at maximum rate. To ensure this we have installed a photoswitch (RCA) in the supply hopper. This switch keeps the flume (A in upper photo) open, feeding the hopper, unless level in the hopper rises too high. Then it actuates an air cylinder (C) that moves a metal vane (arrow in above photo) stopping flow to the flume—all flow will then go to the bulk freezing flume (B).

If our requirements are such that we wish to overcome the action of the photoswitch a manual control can be operated to split the flow, or direct all of it to the bulk freezer.—*Webster McAllen, Plant Superintendent, Phillips Packing Co., Cambridge, Md.*



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TIME TESTED—Inspection of United Cork installations after 10 to 20 years service has shown the insulation to be as good as new—no deterioration—no loss in insulating effectiveness.

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UNITED'S COMPLETE INSTALLATION SERVICE—Our skilled erection crews, located at each of our branch offices can handle your complete installations. Avoid delays and improper applications of insulation by using United's experienced design and installation service.—Use the coupon below for additional product information and installation data.

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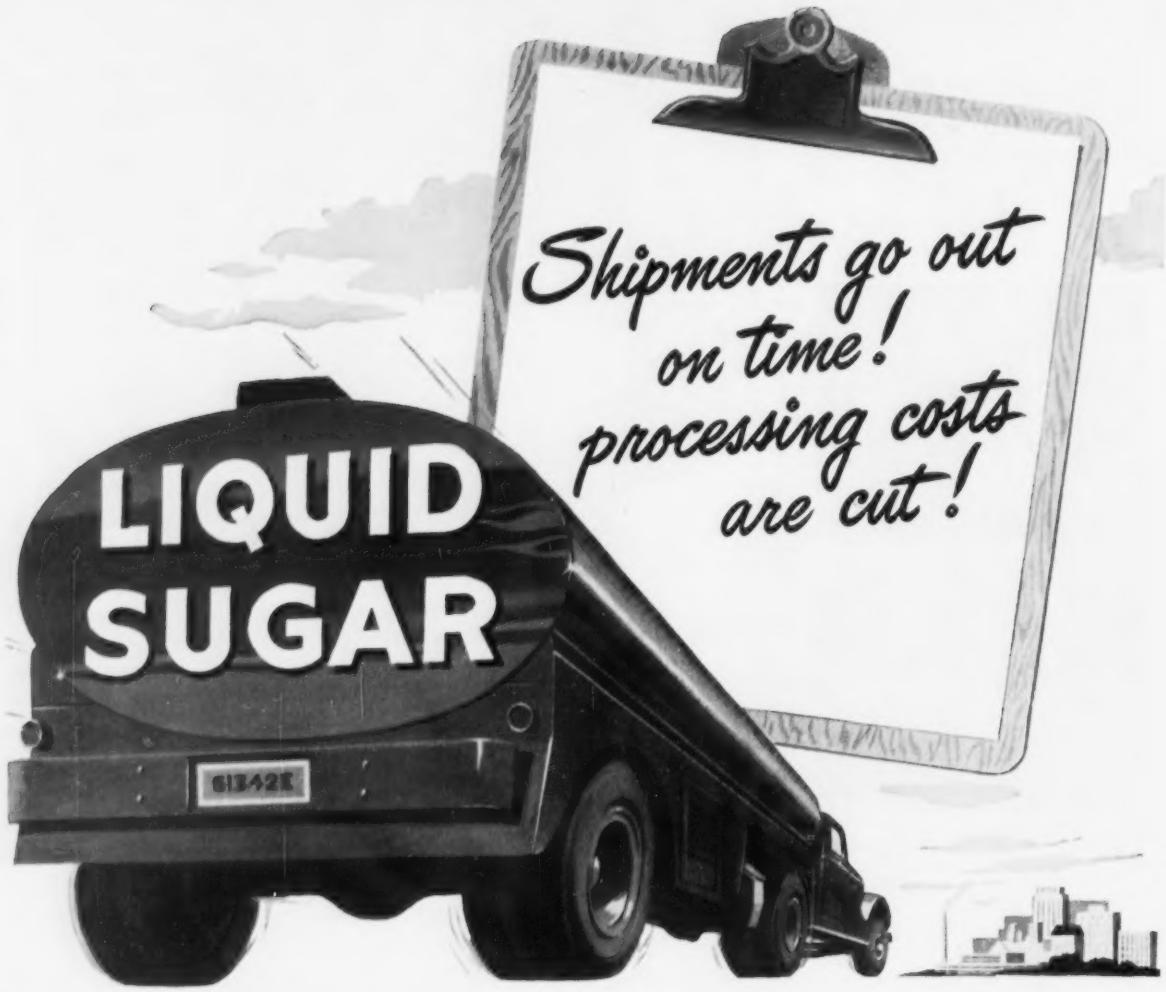

YOU SAVE both time and money when you clarify sugar liquors with Celite* diatomite filter aids. Save time because Celite filtration lets you combine P_2O_5 lime defecation, decolorization and clarification *all* in one operation (and insures you of outstanding color removal and brilliant clarity, too). Save money because you use your existing mixing tanks and filters and reduce decolorizing vegetable carbon consumption. In addition, in bone char refineries, char filter loads are also reduced when Celite filtration is used.

Celite also gives you important advantages over other diatomites. First, its lower wet density provides greater filter surface coverage . . . six bags do the work of seven bags of other diatomites. Second, you get more consistent results because Celite is more uniform. Each bag is mined and processed at the world's largest and purest commercial diatomite deposit . . . and sped to you direct or through J-M's nationwide warehouse network.

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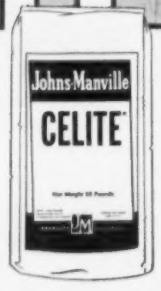

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

For more information on how Celite filtration can save you time and money and give you better filtration results, call your nearby Celite engineer or write Johns-Manville, Box 14, New York 16, N.Y. In Canada, Port Credit, Ontario.

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diatomite filter aids

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Back NCA Additives Bill – It's Safe, Sane

At long last, a safe and sane food additives bill has been proposed. It is H.R. 8390, written by Thomas Austern for National Canners Assn., and introduced by Representative Harris on June 26.

Food and chemical manufacturers should come out of the fog of additive confusion and rally around this practical bill.

They will do well to push for its passage vigorously and concertedly before some other legislation is enacted that makes progress the price of additional consumer safety—that so strengthens FDA power as to pose the potential of one-man bureaucratic control of food manufacturing—that is so complex and ambiguously worded as to entangle all who become involved in a legalistic spiderweb.

Pretesting Plus Notification

The new Harris bill constitutes the simple and constructive type of amendment to which we pointed in our May editorial criticizing FDA's additives bill for its booby traps. And it is written in clear, concise English that says what it means.

NCA's proposed amendment to the Federal Food, Drug & Cosmetic Act specifies that a new additive be pretested, with the evidence of safety being presented to the Secretary of the Health, Education & Welfare Department, FDA's boss. Then the Secretary would, within 120 days, deliver his opinion (really FDA's) as to whether the additive has been adequately tested and is safe under conditions of its intended use.

If the evaluation be negative, the additive shall not be used without prior notice to the Secretary 90 days before the proposed first shipment. And this notice shall specify the identity of the additive and the food in which it is to be used, as well as the quantity, and designation and consignee.

That very effectively lays the cards face up on the table. Yet it does not give FDA all of the trumps.

At this point, if the Secretary believes he must act to protect public health, he may cause an appropriate injunction proceeding to be instituted with respect to such additive or the food containing it. And a temporary restraining order may be issued in accordance with federal rules of civil procedure.

Another interesting provision of the bill is the exemption from penalties of anyone using a food additive if he establishes a guaranty signed by the person from whom he received the material. Such guaranty would be to the effect that as so used the additive or the food containing it is not adulterated or misbranded.

Protects Consumers, Industry

This simple bill effectively corrects the one potentially hazardous weakness of the present federal food law. It prevents the use of a new additive without pretesting for safety and requires prior notice that alerts FDA.

If it is enacted, consumers are protected and interested parties can take their cool time to develop unemotional agreement on additional but less important refinements—if they so choose.

Not the least of benefits from its passage would be to take much of the wind out of the sails of politicians who make capital out of chemicals in foods.

P.S.: As this went to press, NCA's bill already was gaining influential backing. More power to it!

Among the thousands of users...

THE DEMPSTER DUMPSTER® SYSTEM

Helps Make Possible Plant-Wide Cleanliness and Sanitation at . . . ELI LILLY and COMPANY

Noted for its plant-wide cleanliness and sanitation, Eli Lilly and Company attributes much of the success of its efficient, sanitary handling of bulk materials to the Dempster-Dumpster System. In addition to the fire hazards, the unsanitary waste material accumulation and collection with conventional methods, the high cost of handling constitutes a further problem for many manufacturers. Thousands of users like Eli Lilly and Company have found the Dempster-Dumpster System helps to solve all these problems! One truck-mounted Dempster-Dumpster serves scores of big steel detachable containers, one-after-another. There is a container available or that can be built to suit the requirements of all materials, regardless of description. And one man, the Dempster-Dumpster driver, handles them all! Capacities up to 21 cu. yds. Payloads up to and over 36,000 lbs. Ask us to forward complete literature. Manufactured by Dempster Brothers, Inc.

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5 Factors That Win

Top Lab-Team Performance

In this expert's very practical prescription, recognizing men with true potential is primary. Then comes emphasis on vital comradeship, modern facilities, fair policies, and worthy compensation

WHAT FACTORS make for highest productivity from your industrial laboratory personnel?

If you are the administrator of such a group of scientists, your own jobs are numerous indeed—with all the necessary selling of ideas, budgeting, consultation, recruitment, and the like.

It is worthwhile to note, however, that none of the above functions is of any value except insofar as it is backed up by the productive work of the scientific personnel under your jurisdiction.

First, let us make a trial-balance listing of the elements you need for top productivity:

1. **Well-trained scientists with sharp intellects.**
2. **A good spirit of comradeship among the scientists, and also between the scientists and other personnel in the company, at all levels.**
3. **Adequate modern equipment and reasonably pleasant building space and location.**
4. **Company and departmental policies which will leave no doubt in the minds of these technical employees that they will receive fair treatment and that their security and advancement are to be based solely on their accomplishments.**
5. **A salary scale that is as good or better than those of other companies.**

ROY C. NEWTON, Vice-President in Charge of Research, Swift & Company, Chicago

. . . has been hailed as "one of the ten ablest in the sphere of food-industry chemistry (FE Mar., p. 155). And so he brings the keenest of concepts to these pertinent questions of what you need IN laboratory men and what you need FOR laboratory men.

Constantly active with these ideas—over decades of notable production—Dr. Newton has contributed scores of improved foods and processes. He is best known for his application of gum guaiac as an antioxidant in lard. Further, he holds many patents, particularly in stabilization of oils and fats.

Cited for "brilliant leadership in food technology," he recently received the American Institute of Chemists' 1957 Gold Medal. He is also a recipient of the Nicholas Appert Award and the Industrial Research Institute Award.

He joined Swift in 1924, after receiving his doctorate from the University of Chicago. Since 1941 he has been vice-president of the packing company.

1. "GET THE RIGHT MEN"

Indoctrination of men begins with their interviews prior to employment. A young fellow fresh out of college will remember his interview long after his employer has forgotten it.

Hiring scientists today isn't the same as it was back in the '30s. Whereas it is now difficult to even set up interviews, in those depression years applicants came to me by the hundreds, and although we had no openings, I never failed to interview them personally.

They still come up to me, at scientific meetings, and say: "I had an interview with you for employment back in '34, and you sent me to such and such a company." And I say to them: "I should have hired you! Do you want a job now?"

There are several primary interests relative to the man interviewed for a job—

A. What kind of work is considered? Does it fit his particular training and interest?

B. What kind of facilities are available? What kind of people would he be working with?

C. What kind of business does the company have? Is it a successful company?

D. What are his chances for advancement? Could he be transferred to other work within the company (sales, operating, etc.) to broaden his opportunities?

E. What is the starting salary and salary policy?

These five points should be "down pat" in the mind of the man conducting the interview, and he should give the applicant all the straightforward answers.

Next comes sizing up the man to see if he fits the needs of the job. Perhaps no two people would go

". . . You can't find out in a yes-or-no interview."

about this in the same way, but I can give you my views:

You'll first want to know about the man's training. Is he a biochemist, physical chemist, or what? Where did he graduate? Who was his major professor? If he's had experience, where was it, and in what line?

If you know the universities and the professors, you have all you need on his training from these queries.

I learned long ago not to start asking these boys technical questions. They were fresh from the classroom and so far ahead of me that I couldn't be sure whether or not they gave me the right answers.

At any rate, if professors I know and respect graduate a man, it is good evidence he has the basic training.

The things I really want to find out are: (1) Something about his character, (2) whether he has high standards of performance, (3) the sharpness of his intellect, and (4) his type of personality to determine whether he can be integrated with our staff.

So I ask him any question that will get him to talk: "Where were you born? What was your father's line of business? How many brothers and sisters do you have? What do you plan as your life work?" Etcetera.

Here, I listen carefully for any handicaps that he may have to overcome. I size up his enthusiasm and determine how quickly he can adjust his conversation to a change of subject. His degree of polish should be judged according to his age and home background and experience.

It isn't his present status but his *potential for development* that is important. This can't be learned by a yes-and-no interview. The man must be induced to display his spirit.

Furthermore, if you do hire him after this more meaningful type of interview, he will be proud of himself—the best starting point for his development.

The first month a man is on the job is very important. Most of us fail, as administrators, to take advantage of this impressionable period. To start his development we should assign him to work which will bring him into intimate contact with the best, most successful, most enthusiastic man on our staff.

In this beginning period, we must be sure the man supervising the newcomer's work is understanding and sincerely interested in his progress. A warm, friendly, informal man-to-man relationship, which encourages constructive correction, along with frequent evaluation of progress, does much to reduce the shifting which now occurs too often in a young man's early years. Over the range of time, he'll be a better man if—

A. He knows exactly what's expected of him.

B. He's assigned enough work to feel a challenge to keep busy.

C. He's advised in advance of every change that affects him or his status.

D. He feels free to discuss his salary and status, as well as his chances for advancement, with his immediate superior and with the director of the laboratories.

E. He feels that his superiors are sympathetic and will go out of their way to help him overcome any inconvenience he meets.

F. He's treated with the respect due a professional.

G. His accomplishments are appreciated and moderately but sincerely praised.

H. He's encouraged to be bold in his plans and made to feel that any honest mistake or failure of one of these bold ideas will not mitigate his chances for advancement.

I. He can exchange ideas with full confidence that in the end he'll get credit for his work.

J. He knows that he doesn't have to beg for a salary increase.

There is another facet in getting the right man for the right job, and it can be most important of all:

How should you handle cases of separation?

There are two classes here—the man quits, or he's discharged. He may be discharged for many reasons. However, most often it's unsatisfactory performance.

If a man is incapable on one task, he should be tried on another and given special attention in a sincere attempt to make him useful. In the end, however, if he must be replaced it's important to be absolutely fair with him. He should be given plenty of time and help in finding a new job.

Remember that you, as administrator, also made a mistake—when you hired him, or in his job training. Remember that all other employees are watching your spirit of fair play. Remember, too, that this man who's leaving may be a customer of yours on his next job.

Suppose, on the other hand, that he's one of your really good men and you dislike very much to see him go. This is your chance to learn how to improve conditions in your laboratory. Encourage this man to tell you if anything is irritating the men.

Above all, be sure to tell him you've appreciated his work, and that if he doesn't like it where he's going, to come back and talk it over with you. You often get them back. And when you do, they are yours for life.

2. "ASSURE CREATIVE COMRADESHIP"

Especially to be promoted is comradeship—intergroup, inter-department, and at all levels.

In this connection, I recall when I started on my present job 32 years ago. I was assigned a laboratory next to a very fine elderly man—Paul Escher. We had many interesting discussions, and I remember well his emphasis on what he called "cross-fertilization of ideas."

It was his thesis that an idea was seldom mature until it had been rolled back and forth between two or more people having interest and insight in the subject.

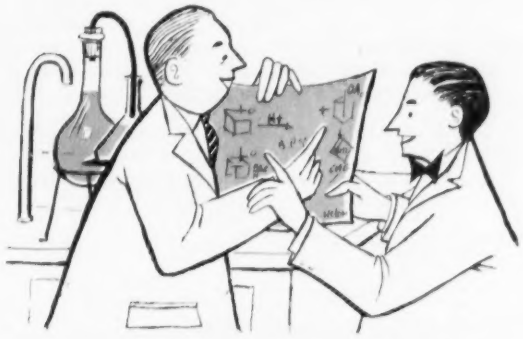
Scientists are people, and people are happy when working among others whom they like and respect. Happiness alone would justify putting an accent on a cordial atmosphere among creative workers. But "cross-fertilization of ideas" is so valuable that it transcends other reasons for harmony and mutual respect among scientists.

Such harmony can be developed in a laboratory, but it must be consciously sought and encouraged. We expect our men to work, not because they are driven, but because they are so enthusiastic they can't resist it.

Perhaps the most productive work they do is when they drop into another section of the laboratories to "try out" the germ of an idea on another scientist. This should be encouraged. And the men should never have a guilt complex that someone suspects them of loafing. Rather, it is the results that count—not the accountability of time.

You have new men coming into your laboratory every year. New supervisors and directors are appointed. It is important that these men be trained so that the proper attitude prevails from one administrative generation to the next. In the urgency of today's rapid industrial pace, it is an attitude which can be lost and is difficult to re-establish.

We've found that informal project conferences are useful in bringing about an exchange of ideas between men of different disciplines and different divisions of



". . . Cross-fertilization of ideas tops other reasons."

our laboratories. Each man reports on the work he is doing, and all can discuss it and make suggestions.

The secret, of course, is to conduct the conference on a friendly basis so that private discussions will continue afterward.

Conferences of a more formal nature include the commercial and manufacturing departments of the business. Thus afforded is a starting point for these non-scientists to influence the direction of our research to fit the needs of our business better.

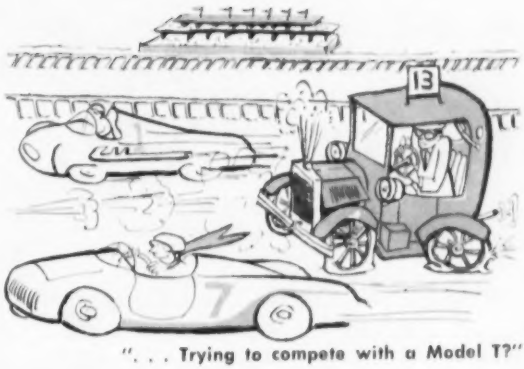
Our division heads are in weekly or even daily contact with the commercial and manufacturing people. All this helps focus our research and development programs. But perhaps its effect in bringing about cordial, happy relationships is even more important.

A successful researcher must live with his project day and night. He can't do this if there is a background of jealousy or criticism.

A man may need criticism at times, but it should come only from his superior and in private. Such talks should be clearly defined, friendly, and constructive. The man in question should be encouraged to explain his position—and should be allowed to come out of the interview a bigger man than when he went in.

3. "ACCENT GOOD TOOLS & FACILITIES"

Adequate equipment with which to work and proper surroundings for the tasks are vital.



". . . Trying to compete with a Model T?"

Today's industrial application of science is a highly competitive business. How would you like to enter the Indianapolis race with a 1915 Model T Ford?

No one will deny that important new developments can still be made with improvised equipment. But think how much more can be done with reasonable equipment and good instruments!

A man should be able to feel proud of his facilities. Adequate space actually isn't enough if it is in a dilapidated building in unpleasant surroundings. This may relate to pride and prestige or it may be a matter of actual physical convenience. At any rate, I am speaking of *productivity* and not of some ephemeral thing which would be nice for the men.

Productivity is what the company is paying for when we hire men and provide facilities. It is our job to consider all factors which affect these results.

4. "STRESS FAIR PERSONNEL POLICIES"

Departmental policies are so important and so much closer to the worker that they often overshadow company policies. Consider a few things that you and I would, as workers, think most pertinent. If you are in administration, think back to what you once thought.

First, we want recognition. Does the supervisor claim credit for the ideas and accomplishments of his team?

". . . Somebody will be unhappy."

Does the boss want his name on every publication and patent issued?

If he does, someone will eventually be unhappy, and unhappiness takes a man's mind off his work. This is not an imaginary fault. Who among us in administrative work can honestly say that we have not been given credit, at times, for the work of one of our associates?

". . . it becomes less important."

It is a point that the administrator must guard against.

Other factors are permission to publish results of good research, and encouragement to take part in activities of scientific societies. These and many more affect the prestige of a man, and prestige is a part of self-confidence. Who can create without it?

We have been discussing these things under the heading of departmental policies. But they might equally be considered under the heading of "Building Men." You can't build men unless they are proud of their boss, their company, and their job, as well as of their own individual accomplishments.

It has been my experience that men develop when their seniors place confidence in them. We often say a man grows because of his experience or because he is given responsibility. It is my belief that he grows mostly because his superior has enough confidence in him to give him responsibility and let him get the experience. Prestige and ego build the man. The experience is incidental.

These are the kinds of things which are within the scope of departmental policy and which are so important to the creative productivity of a group of scientists.

5. "RANGE A WORTHY SALARY SCALE"

You will note that I have put salary last on my list. This, of course, can be challenged. But I firmly believe that if a man's salary is *fair* it becomes less important to him than any of the previously discussed points.

As I've stated, the target should be a scale as good, if not better than, those elsewhere.

Let us, over all, look at company policy as the broad framework in which to attain best productivity.

Our own company president, in a speech a few years ago, summed up employer-employee relationship. His statement of company policy was very clearly put:

"Hire them young, select them carefully, teach them well, compensate them fairly, provide opportunities for their advancement, assist them in sickness and adversity, and provide a pension for their old age."

The above article was taken from the author's address, "Employee Relations in the Laboratory," delivered at the recent Annual Meeting of the American Institute of Chemists in Akron, Ohio.

PERMANENT COAT'S base is quickly "gunned on," sealing motar joints of raw cinder-block wall (compare with untreated section below). A final, tough, glaze coat will follow, giving a smooth, seamless surface.

Simple ceramic-spray technique

Cuts Wall-Surfacing Costs

New sanitary high-glaze finish is rapidly applied to any building material—and without special wall preparation

FE STAFF

COST-CONSCIOUS processors today are taking a sharp look at a new sanitary wall surfacing. It's a high-glaze, vitreous finish that's sprayed directly onto any clean structural material or painted surface in a two-stage, 48-hr. operation.

In this simple process, a special base coat (Ceramix) is first applied. Then after drying for 24 hr., the surface is sprayed with the final coat —the colorless glaze that cures at room temperature.

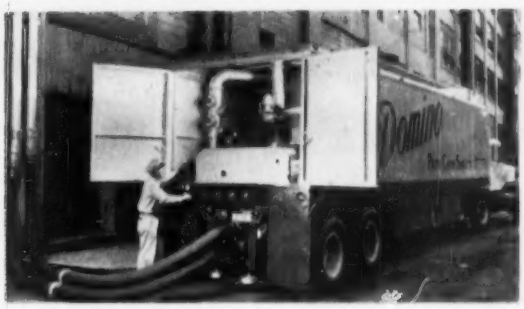
Materials and special spray equipment employed were developed by Preco Chemical Corp., Farmingdale, N. Y., which factory-trains and licenses applicators nationally to do this work. A typical three-man crew can surface some 1,500 sq. ft. of wall per day.

In making a strong bid for wide food-industry use, the company cites these four notable advantages of its finish.

1. **Economy** – Major savings in time and labor are gained by the speed and efficiency of spraying.

Furthermore, the only wall preparation required is a cleansing of the surface to free it of dust, loose dirt, and grease. In new construction, spraying is done after electrical-conduit work and plumbing are completed, thus no patching is necessary.

(Turn to page 62)



FAST, ECONOMICAL SERVICE is provided by these units serving New York City and Philadelphia. Left: Trailer operated by National Sugar Refining Co. Right: Unit run by American Sugar Refining Co. These bulk carriers discharge sugar through sanitary pipelines directly into users' storage bins. Power units and blowers are in trailers' rear compartments, dust collectors for recirculated air are at front.

Pneumatic Sugar Delivery—*For More Users*

New, shorter, self-unloading trailers can supply any size plant. Now in Eastern state service, they—

- **Can save user up to 25c. per cwt.**
- **Eliminate manual handling**
- **Recover valuable storage space**
- **Simplify inventory control**

PARTICULARLY IMPORTANT to food processors, in this day of rising costs, is the recent introduction of special-model, pneumatic, self-unloading trailers that bulk-deliver sugar.

Now operating on the East Coast, these units open the door to use of this economical and efficient technique by any size plant. Formerly, it was applicable only to the larger ones.

Sugar can be delivered virtually dust-free. And user savings can range up to 25c. per cwt.

True, larger pneumatically unloaded carriers have been in successful use on the West Coast (FE Feb '56, p. 95). But these are too bulky for efficient operation in the East and Midwest. The new trailers, however, are short enough to operate in these areas where size is sharply limited by law.

They haul payloads up to 36,000 lb., and discharge horizontally or vertically to storage bins over 150 ft. away. Furthermore, this service permits automatic gravity-feed from bin to points of use.

To receive shipments, the processor needs only: A storage bin; a breather and combination vac-pressure relief valve (costing less than $200); and two 6-in. sanitary pipelines (unless the bin is immediately adjacent to the unloading site).

Deliveries are now under way in New York City and Philadelphia, where both National Sugar Refining Co. and American Sugar Refining Co. provide this service. These companies employ similar trucks (built by Fuller Co., Catasauqua, Pa.).

Case Histories of Units in Action

In deliveries to Mrs. Smith's Pie Co., Philadelphia, National's trailer (31 ft. 9 in. long) is connected to two sanitary pipelines that lead to a 65,000-lb.-capacity roof bin. The hookup is made with sanitary, quick-coupling rubber hoses.

In operation, sugar is discharged by a blower (at rear of trailer) through one of the lines at a pressure of 6-8 lb.—sufficient to maintain a flow rate of 1,000 lb. per min. with minimum particle abrasion. Conveying air is then recirculated through the other line to a collecting compartment at front of trailer. Here, airborne dust is removed and clean air is returned to the system.

Sugar is thus received in a fraction of the time required for bag delivery, and with considerable labor saving. Moreover, former bag-storage areas are now converted to work spaces.

In addition, gravity-feed plus automatic scaling have cut in-plant handling. As for inventory control, a light in plant-manager's office tells when the bin needs refilling.

Another user, General Preserve Co., Brooklyn, has taken advantage of this 'high-point' delivery to automate materials handling. Now, at the touch of a lever, sugar funnels down to the cooking area directly from a bin.

Louis Sherry Preserves, Inc., New York City, is being bulk-supplied by American's unit, which is 33 ft. 8 in. long and divided into five compartments. Three of them are stainless bins each holding 10,000 lb. of sugar. The fourth houses the dust collector and the fifth, the air compressor.

Operating at 7½ psi., this unit discharges its 30,000-lb. load to a roof bin in 30 min.

This user anticipates that sugar will cost 25c. less per cwt., and that it will realize additional savings in labor, spillage, sanitation, and floor space. —*End*

Branch Breakdown of 1955-1956 Failures				
	1956		1955	
Branch of Industry	Number	Liabilities	Number	Liabilities
Bakery Products	44	$2,976,000	36	$1,815,000
Beverages (Alcoholic)	2	260,000	4	1,224,000
Beverages (Non-Alcoholic)	23	1,052,000	22	719,000
Canning & Preserving	29	1,758,000	19	2,799,000
Confectionery	23	1,460,000	18	1,117,000
Dairy Products	20	763,000	23	812,000
Grain-Mill Products	10	674,000	4	1,281,000
Meat Products	18	869,000	22	3,154,000
Miscellaneous	19	554,000	17	1,277,000
Totals	188	$10,366,000	165	$14,198,000

Food Manufacturing Failures

And What Causes Them

Last year saw 188 close-downs that ran up creditor losses of over $10,000,000. Here, a Dun & Bradstreet man spotlights the picture, right down to branches of the industry. Then he digs into the causes of these business crackups and cites the danger signals to watch for

JAMES J. ETRO
Dun & Bradstreet, Inc., New York City

TRUE ENOUGH, Dun & Bradstreet's record for 1956 shows that 9,956 out of every 10,000 operating manufacturers of food and kindred products *did not* fail. And the 44 out of every 10,000 who *did* fail represented the fifth lowest rate among the 14 general manufacturing lines for which rates were computed.

Nevertheless, the number that closed up in the food manufacturing industry last year ran up to a total of 188, with losses to creditors of more than $10,000,000—and if you add up the losses for the past 17 years, you'll find the total liability figure summing to over $202,500,000!

And so, while comparisons with other manufacturing lines indicate that things are quite good in the food industry, it must be remembered that the creditors who were unable to collect the millions they lost last year through food manufacturing bankruptcies would have good reason to disagree.

Of course, the prime question is: "What caused the failures?"

Answer: The bulk of them appear to be management failures.

The findings bear out that it is the man who makes the business, and that there is always room for the food manufacturer who knows what he is doing and how to do it.

Before getting to the specifics, however, let us examine the basic picture:

To get the failure rate for one industry, so that it can be compared to other industries and the national average, our firm calculates how many concerns fail out of each 10,000 operating in the line in question.

While the national average rate of failures for all manufacturers in 1956 was 79 per 10,000 operating concerns, the failure rate was 44 for manufacturers of food and kindred products. This is the figure indicating that the food industry is better off than the average manufacturer—and a lot better off than manufacturers in some other lines.

Here's how the food field fits into the failure-rate picture in 1956:

Industry	Failure Rate Per 10,000 Operating Concerns
Furniture	232
Leather & Shoes	175
Apparel	144

Electrical Machinery	143
Transportation Equipment	116
Textiles	107
Metals, Primary & Fabricated	87
AVERAGE OF ALL	79
Machinery	69
Chemicals & Drugs	54
FOOD	44
Paper	42
Lumber	39
Printing & Publishing	31
Stone, Clay & Glass	30

Other '56 figures offer further comparisons: Total businesses, all lines, were up 25% in liabilities from 1955. And total manufacturing was up 22%. In contrast, food manufacturing liabilities were down 27%.

In respect to the food industry's favorable showing, however, it is well to keep in mind that any analysis of the concerns which failed, and why they failed, involves a relatively small group in the industry.

Now let's look more closely at the failure statistics for the food field in '56. The actual loss to creditors incurred by the 188 failures amounted to $10,366,000. Percentagewise, this represented an increase of 14% in numbers, as compared with 1955's reported 165 failures.

As noted above, however, there was a 27% decrease in liabilities, since the preceding year's total had reached $14,198,000. The average liability for each food maker who failed in '56 was $55,128.

The specific breakdown of the failure statistics by food-industry branches—1956 as compared with 1955—is given in the revealing table presented at the start of this article.

"Paid-Ups" Not Counted

It should be pointed out that our figures include only food manufacturers who failed with losses to creditors. Not counted as commercial failures are those who liquidated voluntarily and paid whatever obligations were outstanding at the time they closed down. There is, of course, a great deal of such "paid up" activity.

Below the relatively stable surface of a business population of some 4,200,000 firms, some 350,000 to 400,000 firms discontinue businesses every year—only to be replaced by an equal or slightly higher number.

Some of those who drop out do so with sizable losses to the proprietors. But while they do not look upon themselves as having been business successes, we do not count them among the failures.

Also not included in our tabulations are transfers of ownership. Therefore, the 188 food manufacturers that failed in '56 are not necessarily the only ones who ceased operations—but they were the ones who did so at the expense of someone else.

Pinpointing the Causes

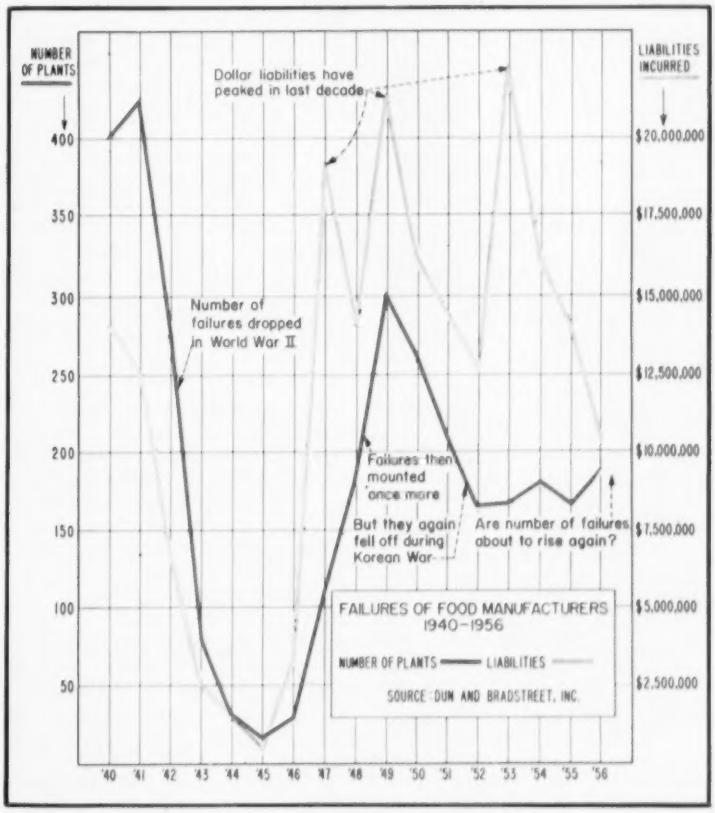
In order to help all businessmen avoid the pitfalls which lead to failure, Dun & Bradstreet tries to get at the cause behind every business failure. To find out why the business failed, the D & B reporter makes a final investigation. When possible, he talks with the principal (owner, partner, or corporate officer), and in addition he checks with banks, suppliers, or other outside sources, to get an objective opinion as to why the failure occurred.

The summing up of all the complex factors that cause a business to fail has its own hazards and limitations. Some reporters will evaluate and judge the factors more accurately than others, and the final analysis—however cold and exact the figures may look on paper—may contain some discrepancies.

Further, the specific information needed to explain why a business failed is not always available after it has failed. The credit reporter must, at times, play "Monday morning quarterback."

The number of food manufacturers that failed last year is too small in itself to break down separately.

(Turn page)



UPS AND DOWNS of food-company failures since 1940 are charted here—one curve showing number of manufacturers who closed their doors, other indicating the dollar liabilities that were incurred. Covered here are: (1) Those businesses that ceased operations following assignments or bankruptcies; (2) those that ceased with loss to creditors after such action as execution, foreclosure, or attachment; (3) those that voluntarily withdrew leaving unpaid obligations; (4) those involved in court actions, such as receivership, reorganization, or arrangement; and (5) those that voluntarily compromised with creditors.

However, our firm's study of the causes of failures among all manufacturers will indicate danger signals that food makers may watch for when checking their operations.

A Look At the Reasons

Our study centered on the 2,285 manufacturing failures (including food manufacturers) of the year '56. First, let us consider the underlying reasons and the attendant breakdown into apparent reasons.

Neglect: 3.1%, breaking down into these apparent causes–

Bad habits	0.5%
Poor health	2.1%
Marital difficulties	0.3%
Other	0.2%

Fraud: 2%, breaking into these apparent causes–

False financial statement	0.3%
Premeditated overbuy	0.1%
Irregular disposal of assets	1.4%
Other	0.2%

Disaster: 1.8%, breaking down into–

Fire	1.1%
Flood	0.3%
Employees' fraud	0.1%
Strike	0.2%
Other	0.1%

As will be noted, however, these figures account for only 6.9% of all failures among manufacturers in '56. Probably some of these could have been prevented through proper insurance. But even if you say that these failures were caused by circumstances beyond human control or "acts of God," they still represent a relatively small part of the whole failure picture.

So we tried to get at the real cause of failure behind the other more than nine out of ten cases that could not be explained by obvious, outside circumstances. And this was the way the various figures fell–

Lack of ability to manage profitably	52.6%
Lack of managerial experience	15.9%
Lack of experience in the line	14.5%
Unbalanced experience	9.7%
Total	92.7%

In short, the great bulk of closedowns are indicated as management failures.

The manufacturing group was further analyzed respecting the surface causes–that is, the reason given by those who failed.

More than one-half (54.5%) said it was because their sales were inadequate (sales management), and another 14.9% blamed tough competition (general management). Further, 11.8% declared it was because they couldn't collect the money owed them (credit management), and another 9.1% said their hands were tied by excessive fixed assets (financial management).

Then there were 8.8% who said heavy operating costs forced them out of business (financial management), while 7.2% held that it was inventory burden (general management) that forced them out. Finally, a few–0.5%–laid their trouble to setting up in a poor location (general management).

Because some failures in this analysis were attributed to a combination of apparent causes, the figures actually account for slightly more than 92.7% of the failures analyzed.

Weight on Human Factor

Of course, human failure is difficult to pin down statistically and, in some instances, the reporter may have erred in his analysis. Yet this same pattern has turned up year after year–indicating the great weight that must be accorded to the human element.

A food manufacturer has the assurance that the field itself has a lot of stability that will work in his favor, and that once he has made a place for himself in the industry, his continuing success will depend more on his own ability than on the general business climate. —*End*

Cuts Wall-Surfacing Costs

—*Continued from page 158*

And presence of extensive piping is no problem.

2. **Sanitation**–The finish provides a smooth, seamless surface that completely seals mortar joints (favorite harborages of microorganisms). And very important, it is easily hosed down or washed with strong caustic or abrasive cleaners.

3. **Permanence**–Coating particles are tenaciously bound to the wall surface. Moreover, the surface has exceptional resistance to impact, chemicals, and weathering, thus minimizing maintenance, and being vitreous the finish won't burn.

When settling cracks appear (typical in new construction), they may easily be patched by the maintenance man without using special tools.

4. **Appearance**–Surfacing is available in a wide range of colors and textures. Any of eight basic shades may be combined with a variety of optional spatter tints, and coatings can be embossed to give three-dimensional or other decorative effects.

Proved Out in Bottling Plant

This spray-on technique had its first food-field application in the new bottling plant at Hires Root Beer Co., Newcastle, Long Island, N. Y. An attractive finish was rapidly sprayed on the cinder block walls of the syrup-processing and filling areas.

Here is the procedure:

First, objects and surfaces not to be sprayed (switch boxes, ceiling near top of wall, etc.) are masked, and a drop cloth is spread on the floor.

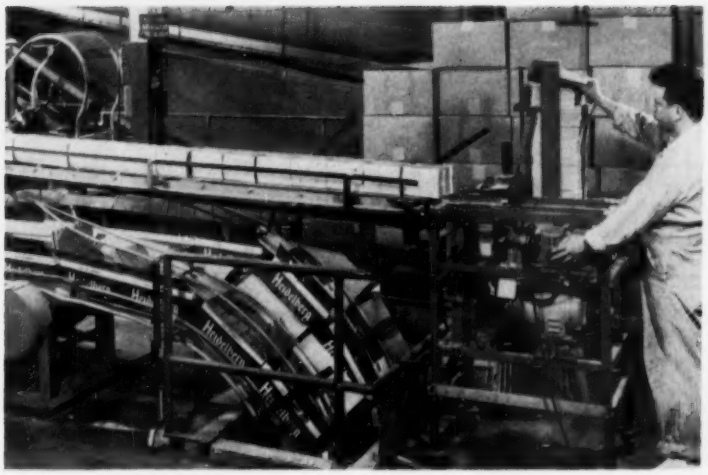
Then base and spatter coats are prepared by mixing pre-measured amounts of powder and liquid in a portable mortar mixer. Unit-packaging of these materials saves preparation time and eliminates possibility of error.

The base coat consists of inorganic cements, hardeners, binders, and pigments, and has the consistency of a heavy cream. The spatter is a similar material, but not quite as thick.

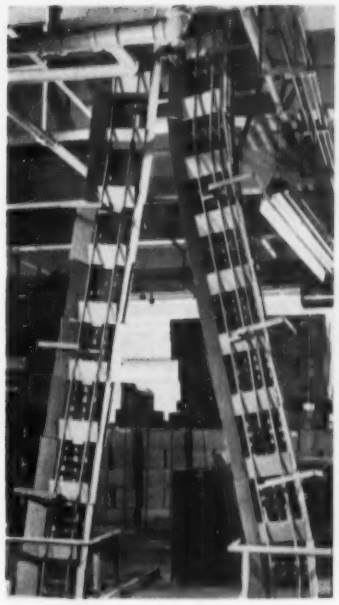
Mixed base is transferred to a supply tank, from which it is pumped to the spray nozzle. Spatter is similarly sprayed, except that it is pumped by air pressure.

Two men apply the finish, one spraying the base and the other following with spatter. A third man supervises the supply lines. In this manner, all surfaces are rapidly covered, and the glaze coat is sprayed the next day.

In addition to its use in food-processing areas, this surfacing provides a superior finish in plant cafeterias, corridors, stairwells, and on exterior walls. —*End*



IN SETTING UP 6-packs, two rolls move 'flat' over stationary suction cup. Next, second cup attaches to case and rises to open it. Then rotating arms fold-in flaps and case goes on conveyor. At left, 24's are seen going into tube-formed chutes.



VERTICAL CHUTES conserve valuable floor space. Tubing 'cages' cartons to prevent fall-off. Photo below: Nearly any desired conveying form can be shaped with this tubing—even compound curves. Note strap-iron frames (as at arrow) set at intervals to hold tubing in place.

Teams Machines & Chutes To Save Labor, Space

New equipment sets up cartons with one-third less manpower. Containers feed into tube-formed conveyors that permit vertical inter-floor travel

RAY BLOOMBERG
Special "Food Engineering" Correspondent, Seattle

ASTUTE COMBINATIONS of modern operating and handling equipment can pay you handsomely—both in solid savings of manpower and also space.

The case of Alt Heidelberg Brewing Co., of Tacoma, Wash., is in point. Here, new automatic case and carton setup machines were installed in tight alliance with new economical, lightweight conveyor chutes that are capable of straight-drop performance.

In this multi-story brewery, the inter-floor chutes drop vertically—in contrast to conventional conveyor systems requiring space-taking incline arrangements with maximum drops of no more than 27 deg.

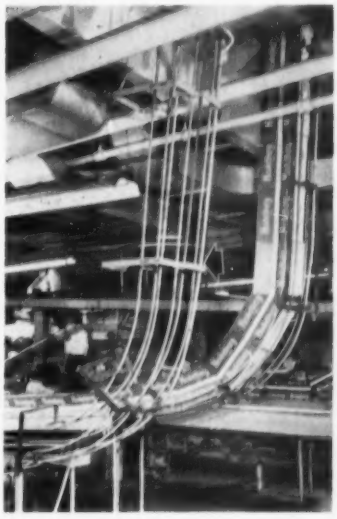
The conveyor chuting is fabricated of E.M.T. (electric metal tubing). This is a steel or aluminum tubing which, within practicality, can be bent into almost any shape desired.

Most of the 500 ft. of conveyor chuting used here requires only four runs of tubing, locked in shape by strap-iron frames. The vertical drops have two extra runs of tubing to guard against fall-off of cases.

At points where cases must be moved horizontally, a rubber belt running along the bottom of the conveyor frame contacts the containers and thus keeps them in motion.

Heidelberg says that one-third the former labor is saved by its four new carton setup machines (made by R. A. Pearson Co., Spokane, Wash.).

Two units handle 6-pack containers at 66 a minute, with their production determined by adjusting a ½-hp. variable-speed motor. A ½-hp. vacuum pump services the two suction cups that open the flat cases.



The other two units "work" the 12- and 24-pack cartons. Powered by a ¾-hp. motor, the 12-pack machine produces 20-40 cases/min., and vac for the two cups is developed by a 1-hp. pump. The 24-pack unit runs 30 cases/min.—*End*

BASIC ELEMENTS of continuous refractometer are: Electronic center (right), optical system and base of housing (center) and sensitive recorder (left). Top of housing is at far left.

New line instrument

Gages Brix at 480 Times/Second

Marriage of electronic and optical techniques produces a flush-mounted process refractometer that boosts control accuracy through speedier readings

FRANCIS S. REED
Sales Engineer, Southeastern Electronic Laboratories, Umatilla, Fla.

PRODUCT UNIFORMITY, long a matter of critical importance in the food industry, can also be a matter of frightening expense where it entails slow, laboratory testing methods.

Now, however, a new instrument—combining optical and electronic techniques—moves measurement of refractive index from the lab to the process line, where its automatic and swift operation boosts accuracy and relieves operators of the control function.

This device scans a ⅛-sq.-in. interface between process liquid and a prism 480 times per second, without passing light through the medium under test. The resultant signal, handled with electronic speed, indicates and records variations in product index. It also actuates air-powered valves to keep product properly blending in the mixing chamber.

Furthermore, because the apparatus is installed flush in the tank wall, and need not employ sampling tubes or other hard-to-clean piping, sanitation is greatly improved. Equipment can be cleaned without removing the device from the line.

Benefits Citrus Plants First

Primary installation of this latest constant-reading refractometer (developed cooperatively by Southeastern Electronic Laboratories and the maker, Industrial Gauges Corp., W. Englewood, N. J.) is in a citrus concentrate plant, where close control of Brix readings is an economic and regulatory necessity.

Here, both evaporator output and cut-back juice are fed directly into a

specially built blend tank, which is large enough for adequate mixing, yet small enough for fast, accurate readings.

The detection head consists of three major parts: (1) The optical system; (2) a servo system that adjusts the optical parts for temperature coorrections; and (3) two amplifiers for boosting the final signal.

The optical system consists of a light source, lenses, and a slit assembly that produce a narrow, parallel light beam. A rotating scanning prism directs this beam through a scanning lens and into a trapezoid-shaped prism that contacts the juice.

Here, the light beam is reflected from one of the non-parallel sides of the prism to the face in contact with the juice. Light that has an angle greater than the critical angle of refraction for the juice is reflected to the other non-parallel side of the prism, and up into a photoelectric eye.

All light with an angle less than the critical angle is refracted into the juice.

Since the scanning beam is directed across the prism 480 times per second, the light striking the photo tube is converted into an alternating electrical signal having a frequency of 480 cps. One part of each cycle results from the presence of light reflected into the photo tube, the other part from the absence of light (refracted into the juice).

The signal is magnified in a preamplifier and transmitted to the control console, where the two half-cycles are compared electronically. The resultant difference is presented on a deviation meter and recorder, both calibrated in units of refractive index.

An additional sensing element, placed in the blending tank wall, detects temperature changes. Signals from this device are fed to an automatic, temperature compensating unit that positions the optical system for correct readings.

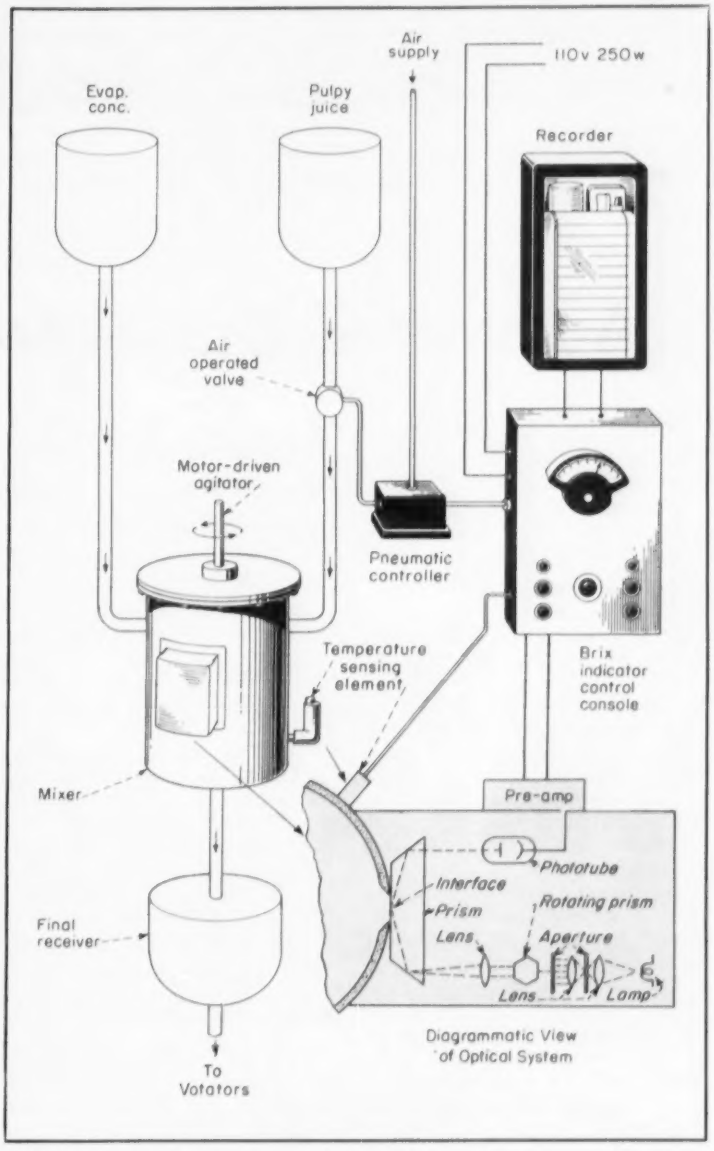
To compensate for variations in product acidity, only a manual control is provided, since this fluctuation is mainly seasonal and thus relatively slow to change.

When these two corrections have been made, the instrument will indicate and control Brix deviations within a company-guaranteed range of 0.05 deg.—a feature that recently led one citrus processor to estimate savings with the new instrument at $50,000 per year!

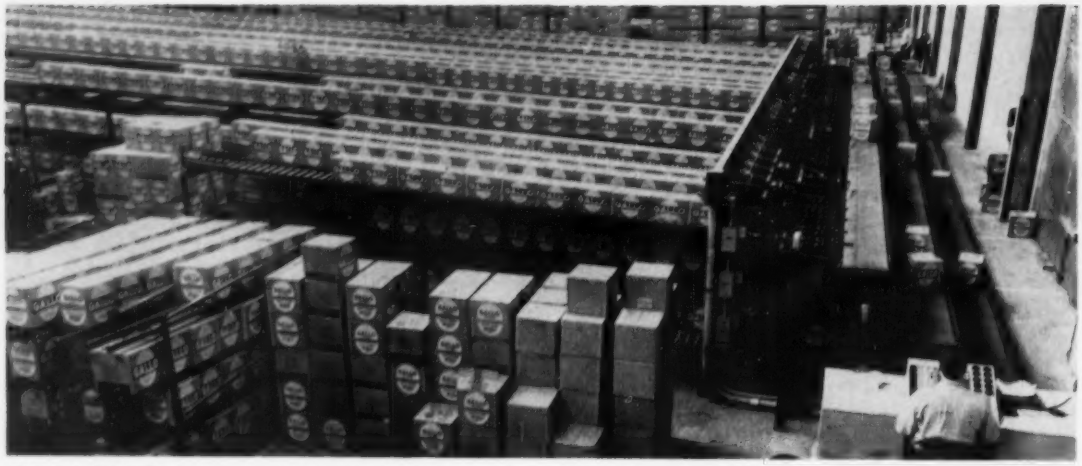
The prototype installation for citrus concentrate has functioned consistently within 0.025 deg. Brix. These precise results stem in part from the instrument's ability to turn in 1,728,000 readings per hour—as contrasted with the few refractive index tests that can be performed by a busy blending tank operator.

This Brixometer is designed around the process conditions it has to face. In the case of concentrate, the installation accommodates a product flow of 0-40 gal. per min., temperature fluctuations up to 20F. (with variations not exceeding 1F. per min.), Brix fluctuations in the concentrate from 50-56 deg., and add-back juice variations from 11-14 deg. (with fluctuations not exceeding 0.5 deg. per min.).

Actually, however, deliberate test attempts to upset the system by inducing variations greater than those mentioned above resulted in very little change in control efficiency.



HOW INSTRUMENT is set up for process-line refractometer readings in a citrus concentrate plant. A servo mechanism (omitted here) rotates the optical system to accommodate variations in product temperature. Note rotating prism in heart of optical mechanism. It determines cycle of readings.



OVERALL VIEW of warehouse shows bank of gravity conveyors on which cases of different commodities are stored. These conveyors are arranged in 3 tiers, each of which discharges to its individual take-away belt (right). The three belts then converge onto a single live roller conveyor at rear. Operator at console (foreground) presses buttons to release cases from storage conveyors.

Automated Order-Makeup System

Electro-mechanical conveying setup enables food warehouse to fill orders faster and with one-third less help. Also reduces losses from inaccurate order-filling and minimizes container breakage

R. W. FISK

Chief Sales Engineer, Mathews Conveyer Co., West Coast Div., San Carlos, Calif.

STRIKING COST REDUCTIONS in materials handling are now possible—through automation of order-makeup in food warehouses.

This is accomplished by an electro-mechanical system that eliminates more than a third of the labor previously required.

Its efficient operation speeds order picking, reduces losses formerly incurred by inaccurate order-filling, and cuts container breakage.

Designed and manufactured by Mathews Conveyer Co., the system features gravity-type roller-conveyor storage lines sloping about ½ in./ft. toward their discharge ends. Here, solenoid-actuated escapements control flow of products to transverse belts that converge in a single chain-driven live-roller discharge conveyor. At end of this unit, products may be palletized and moved to delivery trucks.

Operation of the system is controlled by an electro-mechanical computer designed by Rundel Electric Co., Millbrae, Calif. It is actuated by switches and pushbuttons on a special console.

To set up an order, the operator: (1) Throws the "case-count" switches for the quantity ordered, then (2) sets the "commodity-selector" switch for the appropriate item. He repeats this procedure until the order is filled. Then he presses the "order-completed" button which assembles the entire lot on the discharge conveyor.

Wine Distributor First User

First installation of this system is at Gallo Sales Co., San Francisco—distributor of Gallo wines—where four men operate the entire warehouse. Its theoretical maximum output, based on one large order, is 7,200 cases/hr. Theoretical minimum based on 1-case orders, is 240/hr.

At Gallo, however, orders approximate 8 cases each which enables the handling of 1,200 per hr., or 10,000 per 8-hr. day.

The installation here comprises 69 conveyor storage lines arranged in tiers 3-high. Most of the lines are 100-ft. in length. They provide a total of 5,500 ft. of "mobile" storage space, sufficient to store 4,400 cases. Floor area required is 5,500 sq. ft. By extending short lines, and adding an identical system above the present one storage capacity could be increased to 15,000 ft.

Each of the three tiers of conveyors discharges to its individual transverse belt. These converge upon a single 6-ft. wide chain-driven roller conveyor on which orders are assembled and delivered separately, and in procession, to discharge point.

Details of the Operation

In the early part of each day the four warehousemen load the storage

OPERATING CONSOLE has quantity- and commodity-selector switches with pilot lights (left), storage conveyor selector switches (upper right) and actuating buttons (lower right). Arrows indicate photoelectric cells.

TRAFFIC MONITOR, operated by interlocking cams, controls feed from the three take-away belts (background) to power driven roller conveyor, thus insuring discharge of cases in single line.

Cuts Materials Handling Costs

conveyors, unload incoming trucks and make up split cases. When the system is in operation, two of these men take-off and palletize orders from the discharge conveyor. The third man operates the control console, while the fourth handles cases of splits, consolidates loaded pallets, etc.

At the console operator's left is a vertical bank of quantity-selector switches. These are numbered 1 to 9 and, in addition, there is a switch for 10 and one for 20. By combining the digits with the 10 or 20 switches a case-count of from 1 to 29 may be set-up in the circuitry.

Centrally located on the console are 51 commodity-selector switches. Each of these is equipped with its own pilot light the color of which indicates to the operator from which storage-conveyor line cases are being released.

In the circuitry, the "case-count," or quantity, is first received by two master stepping-switches.

Thereupon, this "count" is transferred from these (when the operator presses the "commodity select" button) to individual stepping-switches each of which controls the escapement of one or more of the storage lines.

When the "order complete" button is pressed, these stepping switches energize their solenoid operating relays in automatic sequence, and the escapement of one line is raised to permit a single case to be discharged on the transverse take-away belt. As each case is discharged the photoelectric cell on this belt signals the stepping-switch and the cycle is repeated until the demand is satisfied. *Turn page*

Pioneers Get Big Payoff

Is this kind of installation and expenditure really necessary?

That's the question you'll be asking first—and here the forecasts give you the picture: For industry as a whole, all factors indicate that automated mechanization will be commonplace within the next decade. Hence, warehouse automation is most certainly to be considered.

Too, the multiplying advances in mechanization and automation will greatly increase the ratio of production per man-hour.

Varieties of products will increase. And, simultaneously, hours worked per week will decrease. As a result, the flow of manpower will be toward those fields where the services are most valuable.

And these will be the plants that have replaced manpower by capital expenditures in advanced equipment.

There will also be an ever increasing demand for improved customer service. To achieve this means boosting the speed of processing, handling, and filling orders—both to satisfy customers and, also, to minimize the amount of capital tied-up in warehouse stocks.

Here are the arguments for starting now:

The equipment for automating warehousing and order-filling is available today.

In years to come, the ratio of profit returned will decrease as the others in this highly competitive field cut costs by improved methods. But the high return that can be achieved now can be used later to step up future warehouse efficiency.—R. W. F.

Regardless of the sequence used by the operator in setting-up the order it will be automatically re-arranged so that the commodity nearest the exit end of the transverse belt will be released first.

When the last case of an order has been released, the "system clear" light goes on to indicate to the operator that he may start setting-up the next one. But he may not release this order until the take-away belts are clear. This interim time perid is controlled by a time-delay unit.

If the operator wishes to speed the operation he by-passes the time-delay by pressing a "by-pass" button. This is done only after a visual inspection shows that he may release the subsequent order without intermixing it with the previous one.

At Gallo's, 20% of the wines make up 80% of the shipping volume. Cases of each of these are placed on two or more of the storage conveyors. Then operator may select any of these lines by positioning a selector-switch. Thus when a red light flashes to indicate a line is empty, he merely moves the proper switch and delivery is made from an alternate line.

If no spare line is available, the operator pulses the stepping switch for that commodity manually, allowing the automatic sequence to continue, and permitting him to mark the cases short on that order.

The three take-away belts are set at different levels to accept the flow from the 3-levels of storage conveyors. These converge at a common level and orders move from them on a live roller-conveyor to cam-operated stop-arms and thence to the discharge of the unit where they are palletized. Pallet-loads are then moved to delivery trucks by fork-lift trucks.

Cost Curves, Pertinent Units

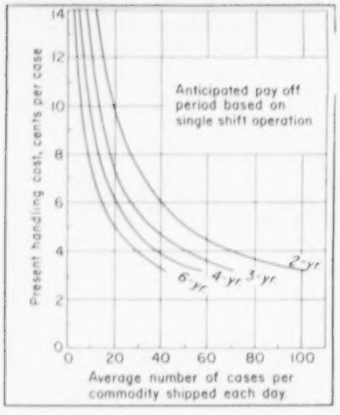

Present handling cost, cents per case
Anticipated pay off period based on single shift operation
6-yr
4-yr
3-yr
2-yr
Average number of cases per commodity shipped each day

FIG. 1. Graphs answer question, will my volume justify investment in an automated system?

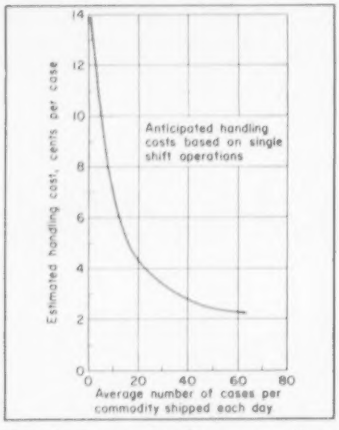

Estimated handling cost, cents per case
Anticipated handling costs based on single shift operations
Average number of cases per commodity shipped each day

FIG. 2. Present handling cost indicates volume of individual items required to pay for equipment in 10 yr.

ESCAPEMENTS (arrows) raise on demand to release cases from storage conveyors. As they move across the wheel sections, the cases are turned and properly positioned on the transverse take-away belts.

Direct Savings From New System

In most warehousing operations there is a large variety of commodities handled. But, usually, the major portion of shipments consist of only a small number of these. This should be taken into consideration when evaluating the merits of an automated system.

Let's consider an example: If an average man can fill orders at a normal rate of 150 cases/hr., using motorized tractor and trailer, it would result in an average picking cost of .06¢ case. This figure includes equipment depreciation, supervision and other overhead expenses.

A system such as Gallo's would pay off in about 6 yr. if an average of 18 cases per storage line are shipped each day, or in 4-yr. if the average is 24 cases. (Fig. 1). This curve makes allowance for manual loading of the system's conveyors, manual stacking into trucks, equipment write-off (with 6-8% profit on investment), maintenance, supervision, and other overhead expenses. Figures will vary with different warehouse operations but the curve will still give an indication as to the advisability of investing in such a system.

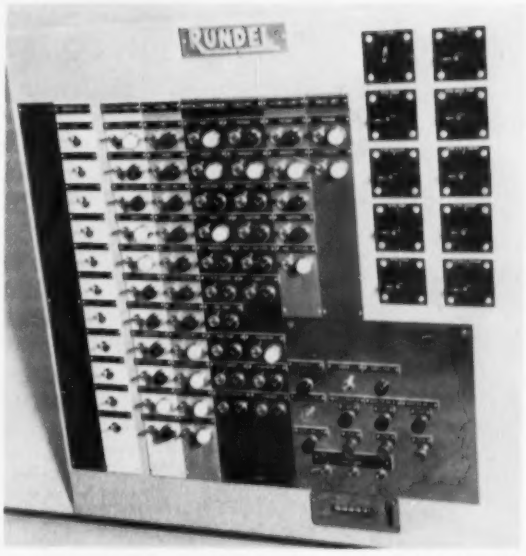
At an average of 25 cases per line per day, a .03½¢ per case handling cost can be anticipated. This is based on a 10-yr. depreciation period and includes all operating and other expenses (Fig. 2).

This curve indicates that if a warehouse presently operates at a cost of 6¢ per case, then the mechanical handling of commodities, each ordered-out at an average of 10 cases per day, would safely retire the required investment.

Further study usually reveals that

Switch Cabinet Revealed; Details of Console

HEART OF SYSTEM, in cabinet under console, comprises stepping-switches and solenoid-operated relays (front) for each conveyor escapement and other basic circuitry at each end.



CLOSEUP shows special color scheme of switch banks—designed to aid console operator in selection of various items required in filling orders.

the investment for handling all items shipped in quantities of five or more per day can be justified. The slower movers can be handled on short storage lines and operate with control equipment and collecting conveyors already justified by the major portion of the system.

Indirect Savings, Too

There are a number of additional savings that accrue from a capital investment in robotized order-picking equipment. Not the least of these is its effect of stabilizing key personnel.

In today's labor markets, it is becoming increasingly difficult to hire, train and keep the desirable type of employees. To train a reliable man to pick-orders is difficult also. And often such a man will soon leave this job when another, a better paying position, becomes available.

With this automated system, fewer key personnel are needed and consequently are more easily kept on the payroll. The extra help needed for loading the unit, loading and unloading pallets and trucks can be acquired as needed.

To date, operating data from this system show a major reduction in losses formerly caused by errors in shipping the incorrect commodities; from shipping extra cases by error, and in breakage. (In computing present cost per case, a factor should be included to account for these losses.)

In addition to the accuracy of filling orders, the factor of faster handling resulting in faster customer service should be considered. An engineering estimate might indicate that this system will increase the volume of daily shipments as much as 10%. If so, this factor should be added to the average number of cases per commodity shipped daily when using the handling-cost estimation graphs.

No Warehouse Too Large

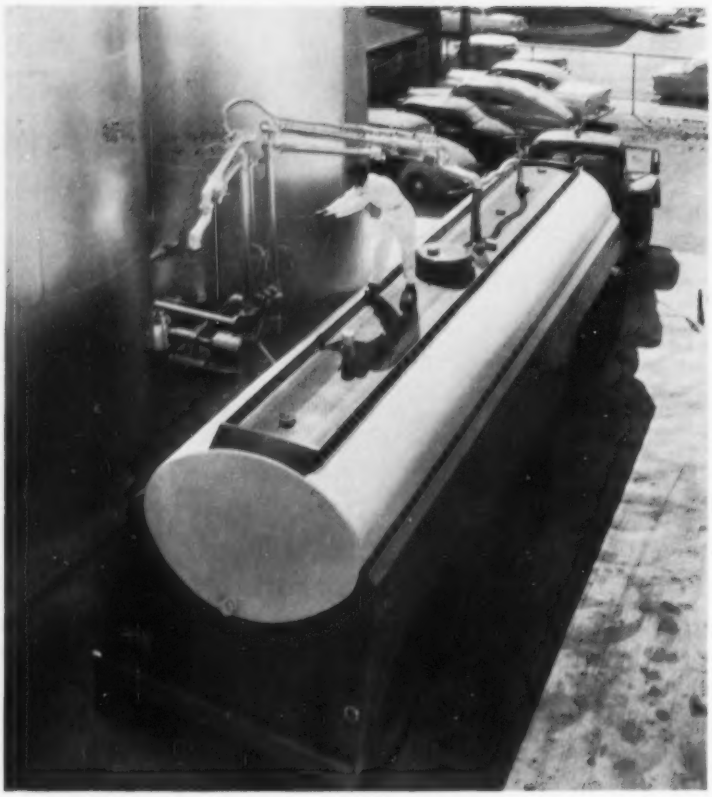
Type and amount of equipment needed for an electro-mechanical order make-up system will vary with the needs of the individual operation. When less than 100 different commodities are normally handled, and manual inventory and billing methods are used, the equipment could be like that employed in this Gallo installation.

For larger operations, and where automatic inventory and billing methods permit the order-fill data, such as punch-cards or tapes, to be fed into the equipment automatically, the capacity and rate of the system is limited only by the equipment installed.

From 1,000 conveyor lines, each cardreader could automatically fill orders at the rate of 25,000-30,000 cases/8-hr. day. Two or more of such systems could be combined and controlled from a common point to provide any capacity that may be desired.

"Yes, it's slowed inspection a bit. But, boy, how it cuts down on bruised fruit!"

Pioneers



LOADING 4,000-gal. tank truck. Interchangeable arms pass in flowing sugar over sterile lamps and through microfilter. Flexible aluminum tube seen at cab end of trailer is for in-put of sterile air.

Top customer service—founded on advanced methods and equipment—proving successful for "unconnected" West Coast operator . . . Spread of idea seen likely

JOHN SHINN

McGraw-Hill Los Angeles News Bureau

BY EXTENDING his line of products—meanwhile taking full advantage of latest techniques and equipment—a West Coast sugar jobber and processor of the powdered product is pioneering a very promising new form of business.

In short, Sugar Products Co., of Vernon, Calif., is now distributing blended sugar and corn syrups as an "independent"—that is, the company is not connected with a refiner.

To fill the customers' needs at competitive prices, the company put stress from the very start on use of modern bulk handling methods and units that assure performance efficiency.

First, a look at what Sugar Products offers buyers:

Blended sweeteners are produced to customer formula. These may include a choice of either regular or high conversion (ion exchange) corn syrups.

The company offers more exact proportioning of sweeteners than the average user is normally capable of mixing with his own equipment. In short, these sweeteners are designed for more thorough blending with less chance of separation, and with less opportunity for discoloration of syrup.

In addition, the company points to substantial savings in equipment for the user. He needs only a single installation—not separate ones for liquid sugar and for corn syrup. And he can eliminate heating equipment, since the blend, unlike corn syrup, is workable at normal temperatures.

Minimum delivery is 3,000-gal., with the usual load running 3,500 or 3,600. With these quantities, charges to the customer are made on the basis of tank-truck prices for corn syrup.

Here is a closeup of the operation:

Liquid syrup is stored in two outside 25,000-gal. tanks. Corn syrup is kept in a room maintained at 90F. by gas heaters. Thus the syrup remains "workable". There are two corn syrup tanks, both of 12,000 gal. One holds the regular syrup, the other the high conversion—or ion exchange—product (Sweetose, A. E. Staley Mfg. Co.).

Syrups are weighed directly into the 4,000-gal. blending tank, instead of being metered. The tank is mounted on a 30-ton Howe batching scale. To make a batch, two hands are set on the scale face—one for the weight of corn syrup, the other for the total batch weight, usually around 3,600 gal. (about 40,000 lb.).

Corn syrup is pumped in first. Then when the weighing indicator reaches the first pointer, this syrup is automatically shut off. Liquid syrup then cuts in, also the agitator starts in motion. When full weight is reached,

In Liquid-Sweetener Marketing

liquid syrup is shut off. The agitator continues for about 1 hr. 15 min.

Accuracy of this method is within ¼ of 1%.

Sterile air is pumped into the tank by a 20-cfm blower. This creates a slight positive pressure, enough so that no contaminated outside air can seep in.

The air passes through a glass filter, then over a bank of sterile lamps. Also filled with sterile air are the delivery tank trucks (via flexible aluminum hoses). A low pressure pump draws this air across two sterile lamps and through a microfilter to the hoses.

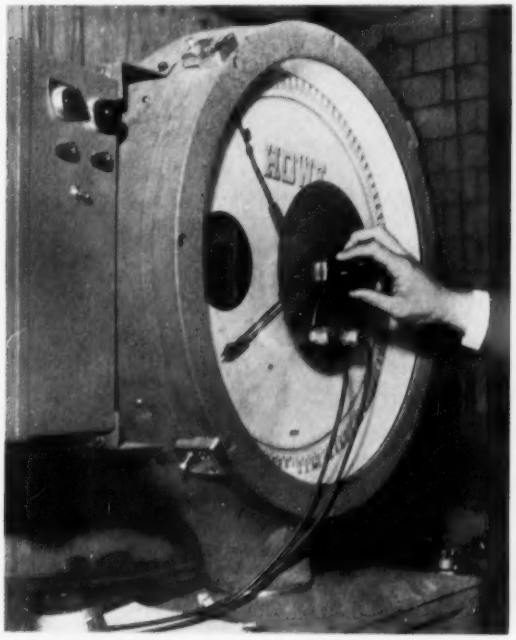
Working through a system of manifolds, a single pump (Viking), located within the temperature controlled room, is used for all except liquid-syrup pumping—unloading tank cars, moving corn syrup to blending tank, and transfering blend from tank to delivery tankers. Liquid syrup is handled by another pump (Smith).

To speed unloading of tank cars, compressed air is pumped into the top of the tanker at 25 psi. This pressure aids the pump pulling it from below.

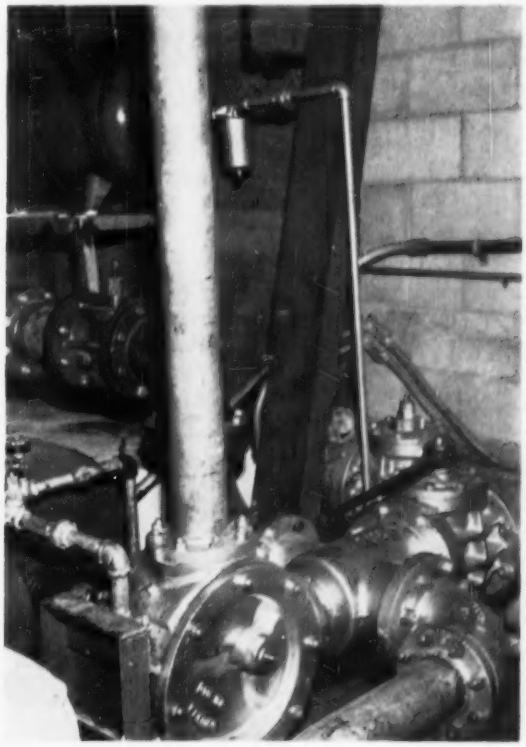
Tank trucks and cars, also blending and storage tanks, are cleaned with steam from a 15-hp. plate boiler. Further, boiler steam is used to heat the blend tank to compensate for additions of unheated sugar.

Sugar Products will finance in-plant installations on a basis similar to that of sugar refiners. Fabricators of the equipment do the engineering.

BLENDING TANK has its own air sterilizer incorporated in black box at top. Sweeteners are held in tank at 90F to keep them workable.

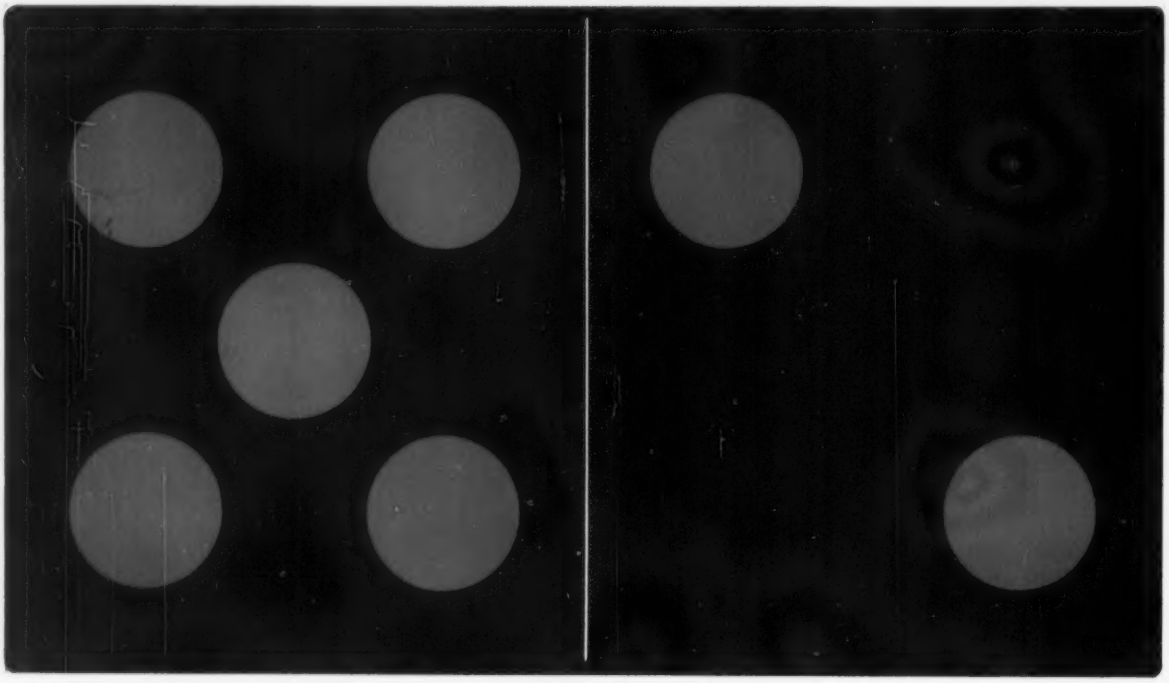


BATCHING SCALE automatically weighs out blend. Operator selects for mix and total batch by adjusting pointers. Result is accurate blend produced to customer formula.



MANIFOLD SYSTEM permits pump to handle many solutions. Compressor (left background) supplies air pressure to speed unloading of trucks.

SPECIAL STARCHES



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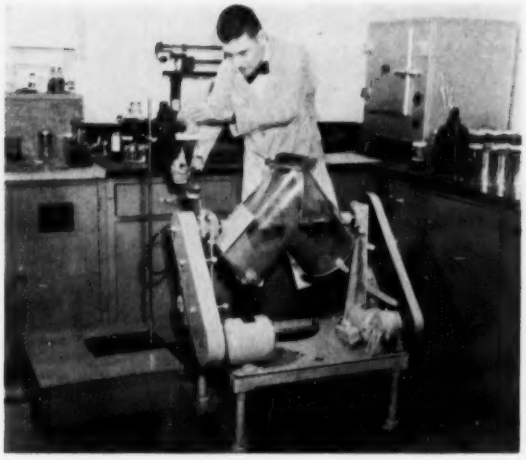


WHEN THIS plastic-shelled laboratory blender was pressed into action at McCormick & Co., production of long-sought free-flowing vanilla sugar was solved. This is a 16-qt. model of mixer. Stainless steel commercial units of up to 50 cu. ft. capacity are available.

Specially designed ingredient-combining machines assure full dispersion in liquid-solid blends . . . Green-lights new attacks on previously problematical mixtures. Also opens way for untried formulations

Makes Better Blends With Advanced Mixer

RICHARD HALL and JOHN J. FISCHER

Respectively Research Director, McCormick & Co., Baltimore, and Chief Engineer, Patterson-Kelley Co., Inc., East Stroudsburg, Pa.

ANYONE WHO MIXES liquids with dry powders will appreciate a special machine that handles such operations in jig fashion.

The unit is designed to incorporate proportionate amounts of liquid into every particle when making production-size batches.

And, most important, it makes possible food-ingredient mixtures heretofore untried or not adopted because of the lack of suitable blending equipment.

Further, lab-units are available for test formulations.

Gaging the Problem

Uniform blending of varying amounts of liquid with a dry mixture can, of course, be a knotty matter. It certainly had been for research chemists at the McCormick & Co.'s research and development laboratory in Baltimore.

But their recent adoption of a laboratory model of the unit (a P-K twin-shell liquid-solids blender, Patterson-Kelley Co., E. Stroudsburg, Pa.) has ended the difficulty.

With this machine such tasks as adding up to 900 cc. of vanilla concentrate to a 20 lb. mixture of starch and anhydrous dextrose have been carried out with excellent results. The resulting product—vanilla sugar—contains no lumps and flows with the characteristics of dry sugar. Here, lab tests have shown complete, even dispersion of liquid throughout the batch.

Moreover, chemists are using the blender to mix other new products, including strictly dry mixtures.

Cleaning of the unit is simple. Being mounted on casters, it can be readily wheeled to a wash area for quick interior hosing to prevent flavor contamination from one formulation to another. This is important, especially when the processing includes such ingredients as garlic, oils, or the like.

In operation on the vanilla sugar product, the two dry ingredients are first pre-mixed in the blender. This step requires about 5 min. Then the liquid is added. It passes through a plastic tube and into a hollow liquid-feed bar.

Centrifugal force then sends the liquid through small openings adjacent a liquid-distributing disk. Located in the shell at the approximate center of the charge, the disk operates inside a stainless steel wire cage. This keeps solids in fine division around the disk.

Thus every dry particle gets a wet coating during the liquid-adding operation. Liquid may be put in to any desired concentration.

McCormick's initial development of vanilla sugar was slow. Thwarting progress was the difficulty of getting uniform distribution of vanilla concentrate throughout the sugar-starch mixture. Batches could not be duplicated. Either too much vanilla was present, or not enough. Moreover, lumps formed readily, a major objection.

The trouble lay in the operation. At that time, the method started with a mixing of the concentrate in a small volume of sugar-starch mixture. Then this small volume was added to the batch in a ribbon mixer.

The sticky mixture immediately lumped up the surrounding material. And the concentration of vanilla in the lumps was too high.

But once the special mixer was adopted for producing vanilla sugar test blends, the chemists were able to produce any number of compositions with identical properties.

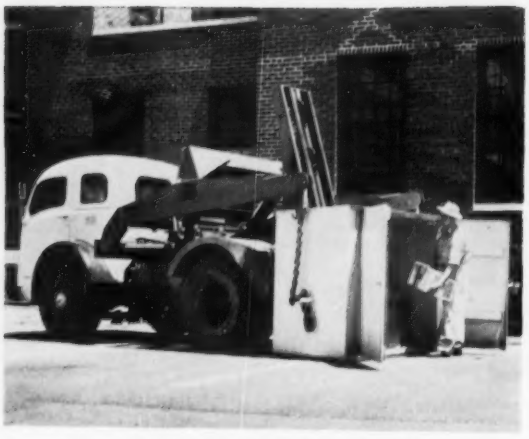
With this accomplished, the work of evaluation and production of small batches for test marketing purposes proceeded speedily.

Accordingly, the batches of vanilla sugar are now being sent to selected zones to determine consumer reaction.

Preliminary testing among institutions and bakeries already indicates that the well-blended product improves quality of pastries and other foods. Solubles of 1 gal. vanilla extract are in 8.3 lb. of mix.

HAULS AWAY TRASH . . .

Cleanly boxed in detachable container, plant rubbish is sped to dump by single pickup driver. He totes one preloaded container after another, returns empties. Dumpster unit is hydraulically operated, truck-mounted.



. . . OR CARRIES PACKAGED ITEMS . . .

Likewise, load of finished goods may be carried. Or such construction materials as sand and cement. Seen underway above is a transfer of supplies from storeroom to lab and offices. Two-door box is of special design.

Efficient Waste-Disposal System:

Totes Finished Goods, Too

Refuse removal has been costly, complicated, and labor-sapping. But now it's streamlined into quick, clean routine by special units . . . Experience of three big users shows way . . . Versatile bulk carriers handle numerous functions, pay added benefits

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

DISPOSING of plant wastes—in all their myriad forms, shapes, and varieties—can be one of the food industry's toughest handling jobs.

There can be trash, rubbish, garbage, metal scrap, wood scrap, cinders, paper, liquid, *ad infinitum* to get rid of. There may be three dozen and more widely scattered gathering spots, inside and outside the buildings. And likely the stuff must be hauled miles for disposal.

Decidedly complicated. But—modern methods have licked this many-headed problem. In fact, the advanced equipment has not only taken waste handling in stride but has also demonstrated its further ability to "double" for toting materials, supplies, finished goods, too.

The old conventional methods of waste disposal have commonly required tedious, backbreaking labor of six and more men, along with four or five regular trucks.

Consider, however, the contrast when such efficient, cost-cutting equipment as the Dempster-Dumpster (Dempster Bros., Inc., Knoxville, Tenn.) goes to work. In some plants, a single man swings the entire routine using D-D units.

This roundup article will show the versatility of this system, which is available either as a wholly owned or contracted-for service. To reveal the many angles, we made a detailed study of applications of the system in three large Midwest plants that have employed it from 4 to 10 years. Shown overall are these notable results:

. . . **Fewer trucks.** One truck-mounted, hydraulically-operated D-D unit, along with as many as 44 detachable containers, takes over the work of up to five conventional trucks. Doing away with these trucks means less gas, oil, tires, and maintenance.

. . . **Less manhours.** One worker with a D-D unit handles any number of detachable containers, thereby eliminating the need for helpers.

. . . **Greater payloads.** Larger size detachable containers carry loads equal to or surpassing those handled by conventional bodies.

. . . **Little idle time.** There's no waiting for loading, for the driver picks up preloaded containers.

Conventional methods have always consumed much time and labor in truck loading, and subsequent crew idleness while waiting for the trucks to return from their hauls.

. . . **Speedier disposal.** Dumping takes but minutes. And when emptied, the unit is returned to its original station for reloading. Or an empty container directly replaces a loaded one. This way, there's always one available for loading, and truck-travel time is cut to the bone.

In some cases, a two-way radio further speeds operations. From a central control room in large plant sites, a dispatcher communicates di-

. . . WITH PICKUPS CONTROLLED BY 2-WAY RADIO

Equipping trucks with radio enables jiffy action on special calls—such as for urgent pickups not on the schedule. Also, driver can radio the dispatcher when trucks are needed. (American Maize photos)

rectly with the D-D truckman for non-scheduled pickups, instead of taking time to go out and look for him.

. . . **No re-handling.** Waste materials are accumulated in special containers, in which they remain until hauled away. Hand-loading into dump trucks is "out."

. . . **Better plant-sanitation.** The systematic and unified method promotes area-wide cleanliness by expediting waste collection and disposal. Specifically designed to handle waste, the metal containers are rat-proof, fly-proof, and fire-proof.

And materials are enclosed in these containers, preventing them being scattered around the area or wind-blown onto neighboring highways and other property. What's more, the areas around the containers remain cleaner. Thus avoided is the possibility of contaminants getting into plants.

. . . **Greater flexibility.** The system also can be employed to bulk-handle materials other than wastes—and very versatilely. It's being used, for example, to transfer finished goods from one area to another, deliver supplies from receiving room to offices or laboratories, haul sand and cement for plant construction work.

Star actor is a truck chassis-mounted unit servicing detachable containers. In the plants visited, the latter varied from 1½ to 6 cu. yd. in capacity. It's to be noted, however, that larger capacity containers are available.

As stated, these containers are spotted at convenient materials-accumulation points.

The D-D unit comprises (1) subframe, (2) three hydraulic cylinders controlled by a multiple valve in the truck cab, (3) boom assembly, and (4) carriage. As for the cylinders, two vertical ones raise and lower the boom, while the horizontal one moves the carriage forward and rearward.

With payload capacities ranging from 6,000 to 15,000 lb., the units are designed to perform three basic lift, haul, and dump operations.

For lifting, the driver backs unit up to loaded container, then he slips the chain links (one on each boom arm) over the lifting pins attached to each end of container. Vertical cylinders, attached to head frame, raise the boom, which elevates container onto skid frame.

Raised to proper height, the horizontal cylinder then moves carriage and container forward toward cab. Lowering of boom arms delivers container onto container-rest and secures it in carrying position. Or, for short hauls, it's just as easy to carry chain-suspended container at rear of unit instead of moving it in regular carrying position.

In dumping the boom lifts container from rest position as horizontal cylinder moves container and carriage rearward into dumping position. It then raises container so that it engages the dumping bail with automatic dumping hook (both part of skid frame).

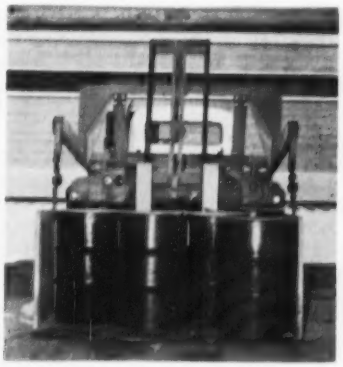
With bottom-dump containers, this hook holds the top section stationary while the bottom automatically opens as boom is lowered. Tilt- and skip-type containers pivot on hinged and rigid bails held by dumping hook as boom lowers.

A few words about the containers:

Except for the tank model, there are two basic types—those that bottom- or tilt-dump. And these come in many variations, such as with legs, casters, lids, doors, etc.

Exemplifying the D-D contracted type of service is the operation at Carlson-Frink Co., Denver (see the photo on p. 78). *Turn page*

PROCESS SWEEPINGS (as corn cobs, kernels, etc.) can be chuted directly into D-D containers. Or spent bleaching earth and filter aid, as seen here at Anderson, Clayton. Chute-and-container arrangement is also suitable for general trash disposal.



USED FLUIDS—Catalysts, lubricants, cleaning materials, and the like—are moved in drums. Handling is in company-built 3-sided skip-type unit having lipped bottom. Carrier will also haul dirt from excavations, can transport machinery, too. (Anderson, Clayton)

SCRAP METAL is handily collected in containers spotted in key areas. This is load from Staley's maintenance shops. A plant's accumulated metals are readily sorted into types to bring higher scrap prices.

SILT is pumped from waste-water trap into specially designed metal tank, which is then hauled away by D-D unit. Tank abolishes former spill-outs. This waste is disposed at city land fill. (Anderson, Clayton)

Now for a close look at the D-D system as used at A. E. Staley Mfg. Co., Decatur, Ill.; Anderson, Clayton & Co. Foods Div., Jacksonville, Ill.; and American Maize-Products Co., Roby, Ind.

A. E. STALEY: CUTS COSTS $9,000 YEARLY

In 1945, this firm conducted a survey to work out its adoption of the Dempster system for handling wastes throughout its 400-acre site.

The former method involved use of four 1½-ton trucks with their drivers totaling 14 loads per shift to the dump area. Hauled away were refuse, contaminated process materials, paper, lumber, etc. In addition, these trucks picked up scrap metal (average, twice a day) for sorting and selling at scrap prices.

Waste materials were accumulated in 36 open-top wooden boxes (5x5x18 in.), with 4x4 skids on the bottom to prevent rotting. From boxes, wastes were shoveled into trucks for an average ¾-mile haul to the dump.

Trouble with these boxes were that they created offensive odors, detracted from good housekeeping, and built up the fly population. What's more, they didn't have sufficient capacity.

Then, in 1948 came purchase of a Dempster truck and 37 containers operating in conjunction with four of the latest Staley dump trucks—two of which were to do regular hauling with the others serving as spares.

Annual cost of operating with this new system was figured as $23,912, including depreciation and maincomparison, the original-method figure was $33,301.

This year, a 9,000-lb. capacity Dempster hoist was obtained. Plans are to keep the old hoist, however, to supplement or complement the new unit.

An investigation covering a 98-day 1956 day-shift period disclosed that 1,697 containers of refuse were hauled away (average of 17.35 per shift). Check of the night shift showed an average removal of another 4.

At present, the company has 44 D-D containers, averaging 6 cu. yd. in capacity. About 80% of them are of the tilt-type and the remainder are drop bottomers.

Shortly after the system was adopted, concrete pads (10 in. thick and 12-ft. square) were poured to support the containers and keep them level with the docks. Trouble with the former dock-side flooring was that the containers scraped away the cinderbed, then dropped and tilted below the dock. During disposal, waste material sometimes missed the containers, scattered around them, and then had to be sweeped up and shoveled into them.

The driver still carries along a shovel to scoop up spillage around pickup docks, also a scraper to clean out containers at the dumping area. During summer months, he hoses down the inside of containers and, depending upon weather and materials handled, he may treat containers with insecticides.

A 2-way radio (Motorola) gives the dispatcher contact with the driver for any unscheduled pickups. The driver also can call the dispatcher whenever he spots materials requiring haulage by other trucks. The garage foreman also roves in a car with 2-way radio, inspecting the 400-acre area.

Handled by the new system, which is an integral part of processing, are: (1) Scrap metal for reclamation; (2) waste process materials from plant grounds, buildings, etc.; (3) garbage and trash; (4) spent activated carbon, filter aid, etc., from oil refinery, corn syrup plant, and glutamate processing; and (5) scrap paper and wood.

To name specific applications:

. . . to haul away in open-top, tilt-type containers, lake silt that accumulates in a surge pit prior to water treatment.

. . . to transport in flat-bottom, skip-type containers gas cylinders for welding jobs. In some cases, wheelbarrows of refuse are rolled into these containers and dumped for disposal (around areas without dock facilities).

. . . to confine wastes at dock areas, in conjunction with drop-bottom containers.

. . . to collect blasting sand and paint cans in the shop where the interior of tank cars are sandblasted and re-finished.

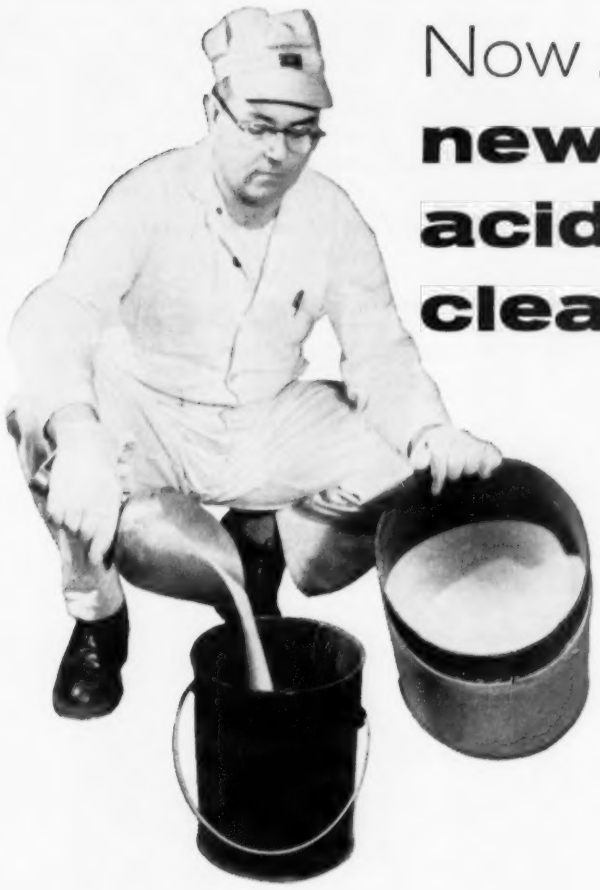
. . . to handle scrap metal coming from the maintenance shops.

. . . to haul such wastes as cartons, crating material, etc., in the receiving department.

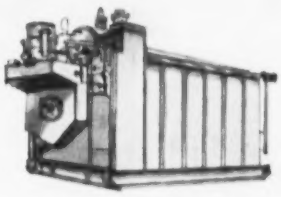
ANDERSON, CLAYTON: GETS EFFICIENCY-PLUS

This company had previously adopted the Dempster-Dumpster system at its Sherman, Tex., plant. Then the new Jacksonville, Ill., edible oil facility, completed in 1952, immediately put the method into operation.

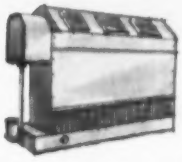
With it, the company is efficiently



Now... new acid cleaners



Steam Boilers, Condensers, Heat Exchangers, Piping



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WHEELING, WEST VIRGINIA

hauling wastes to the plant incinerator or over to the land-fill area.

Here's a breakdown on the waste-handling units and their cost.*

1. An International tandem-drive truck chassis for D-D hoisting unit ($5,000). Company switched to tandem unit because former 2-ton single-action truck often got mired down at the land fill.

2. A 6,000-lb.-capacity hoisting unit, complete with power take-off, control stand, mounting bolts, wooden stringer, and rear fenders for ready truck-chassis mounting ($2,375).

3. Five 2½-cu. yd. tilt-type Dempster containers equipped with cut-outs, outriggers, and 4 to 8-in. all-swivel medium heavy-duty casters ($2,205 total).

Approximately $1,000 was additionally invested after a year to modify containers into semi-closed units.

This was primarily carried out to prevent dissemination of dusty waste (such as spent bleaching earth and filter aid) inside the refinery buildings, and also to facilitate dumping. Tilt mechanisms were altered so containers could turn at a greater angle. This saved hoe-ing out of waste remaining in containers.

It was accomplished by adding an additional foot to container height, putting in a 20x30-in. top opening, building in a latch-type top lid (2x6-ft.), and extending dump bail on front side of bucket to permit it to roll down farther and so completely dump out wastes.

4. Seven 6-cu. yd. drop-bottom containers ($3,724) and two company-made drop-bottoms ($720).

Complete cost of waste-materials handling units, not including tank-type container: $13,024.

As for the two containers that were company-built for special handling jobs, one is a 3-sided skip-type bucket (3-cu. yd. capacity) with a lipped flat bottom. It's employed to move drums (full or empty) from dock height to ground level.

Specifically, it's used for handling such drum-packed materials as spent catalysts, machinery lubricants, plant cleaning materials, etc. It's also employed to haul crushed stones to graveled areas, dirt from excavations, replacement equipment, electric welding machine, etc.

Chief advantage of this container, of course, is to do away with lifting or rolling of drums up ramps. Container is set at ground level so drums can be rolled into it and then transported and set at dock level by the D-D hoist unit.

The other container is a 560-gal. cylindrical metal tank (4x6 ft.) that rests on its side. With 3-in.-dia. top opening and 1¼-in. vent, it sets on a 2-box channel-iron base (8-in.). A 4-in. valved discharge line is saddled into the bottom and center of the tank.

This unit is used about once a month, along with a pump, to clean out silt that accumulates in the waste-water trap. Truck-mounted hoist makes four to five pickups each time to dispose this waste to city land fill.

Before adopting this haul-away tank, the company employed a 2½-cu. yd. tilt-type container. Not only was the disposal operation messy, due to this liquidy waste splashing out of the container, but double the number of trips had to be made.

With the new unit, the driver makes five to eight trips daily to the incinerator (average distance ½ mile), two to five to land fill (about 4 miles away) and three to five to the dirt farm (about 2 miles). And he may, on occasions, take about twenty trips to unload catalysts from box cars.

Specifically, here's how the nine drop-bottom and five tilt-type containers are put to work at the refinery:

One drop-bottom is spoted below the chute adjacent to the melt kettle for collecting empty cans from returned products that are to be re-processed. These cans are then disposed once a day or oftener to city land fill.

Three drop-bottoms are lined up along the finished-products packing-room dock for discarded multi-wall bags, cartons, shipping cases, twine, and baling paper. These are daily carted away to the incinerator. If contaminated with glass or other non-combustible materials, they're taken away to city land fill.

A drop-bottomer at the boiler

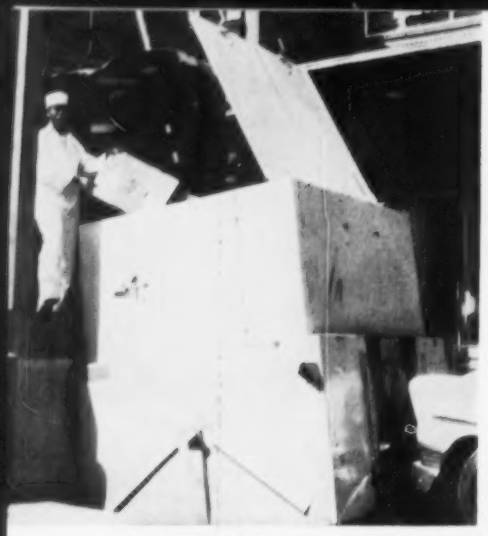
CLINKERS AND ASHES are conveyed daily from basement boiler room into tilt-type container—a direct operation that's much cleaner than old routine. Loads go to land fill. (American Maize)

* All dollar figures given here are those reported by the company as recorded at the time. Readers should note that current price scales well may differ.—*The Editors.*

Works Both Ends in Incinerator Routine

BURNABLE REFUSE is discharged from D-D drop-bottom container into plant incinerator, and then . . .

ASHES are periodically drawn from incinerator into a D-D unit and carted to land fill. (Anderson, Clayton)



CONTRACTOR provides dry-waste disposal service for new $1,000,000 Denver dairy of Carlson-Frink Co. Two D-D units, one at each end of shipping platform, serve milk and ice cream departments. Pickups, dumping, and returning of containers are all handled by the outside firm.

house takes care of empty salt bags, and other refuse such as rags and empty caustic cans, for weekly disposal at the city land fill.

At the processing building, another drop-bottom is used for empty bags (which have contained filtering aid, activated carbon, and bleaching earth); filter press paper; oil-winterizing press cloth; and refuse from rest rooms (every other day).

Another drop-bottomer, does the same job at the refinery twice a week.

Still another drop-bottom unit collects refuse (excelsior, shipping cases, and other combustibles) from the receiving department twice a week.

And still another serves as an expendable unit wherever waste pick-up activities are periodic, such as at the shipping department and box cars. It's also used to pick up non-combustible wastes accumulated in barrels spotted throughout the 30-acre, fenced-in plant area.

Two tilt-types are rolled in below chutes to collect spent bleaching earth and other filtering aids that are chuted from the second floor of the refinery. These wastes are taken once or twice a day.

Two tilt-types carry out similar duties at the processing building. And the fifth tilt-type hauls ashes once a week from incinerator to city land fill.

AMERICAN MAIZE: HAS 9-FUNCTION SYSTEM

This firm adopted the D-D way a decade ago, first employing a unit with ten standard demountable box containers (tilt and bottom-dump) for handling refuse, scrap iron, finished products, etc.

It now has 38 containers ranging from 1½- to 6-cu. yd. capacity. Of these, 14 are tilt, 14 drop, and 10 skip types. Meanwhile, the original truck chassis has been replaced with a new one.

Waste handling is carried out by only one man, working a 7-hr. day and making 28 to 32 round-trips from plant areas to dump site (about a mile away on company property).

The truck is fitted with a 2-way radio (Motorola) to speed chores. For example, the department foreman calls, via central operator, whenever a container is unexpectedly full, requiring haul-away. Operator then radios truck driver, telling him location of container. And within minutes he's carried it off.

A D-D unit now does the work formerly carried out by three separate 2-ton flat-bed yard trucks, each manned by a driver and helper. This switch-over is judged as bringing an annual saving in labor wages of $30,000—a figure within a few hundred dollars of the investment cost of the entire handling system (38 bodies and truck chassis with hoisting unit).

1. Sanitation: Good housekeeping practices prevail in the plant yards and various processing and other departments. There's no longer accumulation of refuse and debris, since they are easily disposed into strategically spotted Dempster bodies throughout yard areas. And there's no longer breeding or harborage areas for insects and rodents. The containers are periodically washed and sprayed with insecticides.

2. Community relations: Waste is now controlled—no more dirt and paper blowing to roadways.

3. Employee relations: Previously, workers had back-breaking, time-consuming tasks of shoveling refuse into wheelbarrows and then into trucks. Now shifted to lighter duties, their morale is up.

Now for specific applications of the demountable bodies and truck:

A. Handling finish goods: Solids—like corn sugar, corn syrup solids, corn starch, etc.—packed in multi-wall paper bags are stacked 15 to 24 bags to a pallet (40x48 in.). Open-front skip-type D-D body is then used for picking up two pallet loads of bagged goods. These are handled to loading docks for mixed box-car shipments. In this system, starch is transferred from starch warehouse to syrup-sugar loading dock, and sweeteners from syrup-sugar warehouse to starch loading dock. These containers also handle up to six 55-gal. drums of syrup for mixed-goods shipment.

B. Salvaging scrap: During 1956, almost 2,000,000 lb. of scrap iron, 30,000 lb. of scrap stainless steel, and 350,000 lb. of scrap paper were salvaged by this system. And total scrap collected sold for about $60,-000.

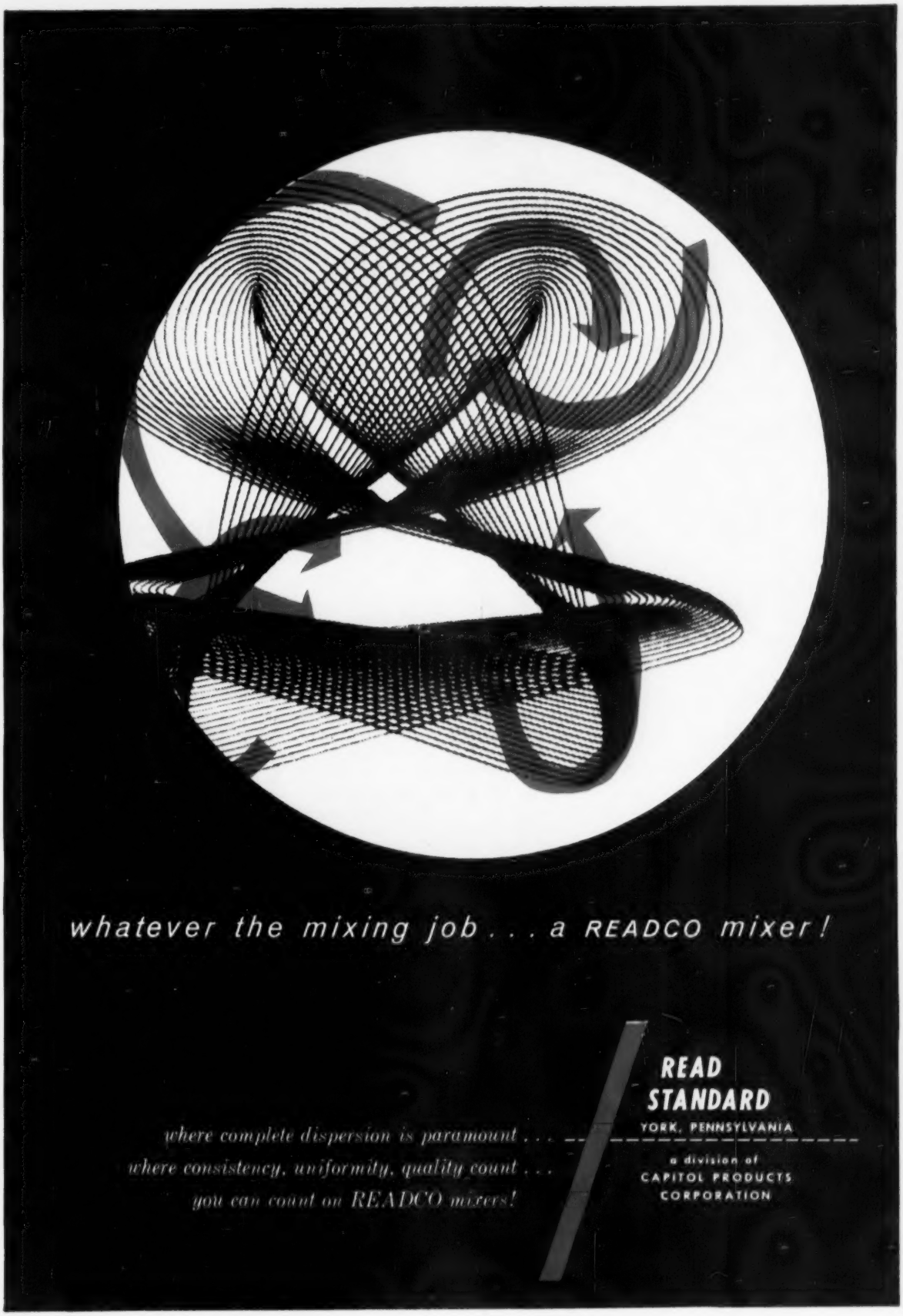
Scrap metal is gathered in containers spotted outside electrical and welding shops, salvage shed, mill and feed houses. They're carted away once or twice weekly to an away-from-the-plant heap, where up to 200 tons of scrap are accumulated before being sold.

So efficient has been this salvaging method that a comprehensive, instead of helter-skelter, system has been enabled. The scrap metal, rather than being gathered in a single lot, is now segregated into sheet metal, No. 1 heavy melting steel, heavy breakable cast iron, cupola cast iron, and rails, thus bringing a higher return. At this writing, segregated rail scrap was bringing $60 a ton, and No. 1 heavy melting steel $48.

C. Hauling clinkers: These are now directly carried by inclined flight-chain conveyor from basement boiler room into an open-top, tilt-type box (4-cu. yd. capacity) located in the yard and disposed about once daily. Formerely, clinkers had to be shoveled into trucks, which then carted them away.

D. Serving maintenance department: A system has been adopted so that an open-type container scoops and carries 4 cu. yd. of sand and, at the same time, totes bags of cement to locations where masonry work is underway. Unit is also being used to carry pallet loads of concrete blocks to new building construction. And it occosionally takes over to haul motors, pumps, re-

(*Turn to page 84*)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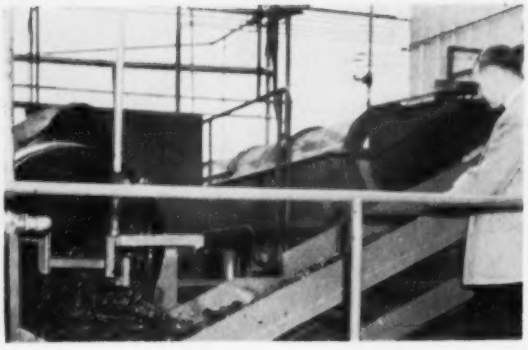


RECEIVING AND WASHING. Left photo shows Arthur Todd (right) and Ventura Farms General Manager W. J. Salter inspecting newly arrived fresh peppers. For processing, they are elevated to rod washer (photo above) equipped with high pressure water sprays. From here they go to . . .

New Extraction Process Improves

Here, fresh peppers are used instead of dried ones. Then separation of sugars and gums from color-containing slurry is followed by acetone extraction—yielding odorless dark-red oil that is free from sludge

ERIC C. TODD

Chemical Engineer, Ventura Farms Frozen Foods, Inc., Oxnard, Calif.

WE HAVE NOW perfected a new wet process for extracting oleoresin paprika color from fresh chili peppers. Thus, we've gained numerous advantages over the conventional procedure, in which dried peppers are used.

In our process, 90% of the sugars, plus other undesirable impurities removed from the peppers by water extraction, are eliminated prior to the solvent extraction. This also greatly reduces the weight of oleoresin-containing material handled in the latter extraction.

Resulting product is a dark ruby-red oil that is comparatively odorless, and free from gums that form sludges in many of the oleoresins.

It is also free from the scorched odor and bitter taste caused by caramelization of sugars extracted in the conventional process.

For use in the new technique*, peppers are picked without stems, brought to the plant, and washed with high pressure water sprays to remove all dirt. They are then inspected and elevated to specially designed rotary breakers.

These consist of rotating drums equipped with sharp spikes that impale the individual peppers and hurl them downward onto a slightly inclined stainless screen. Impact on this screen breaks open the peppers and liberates the seeds and placenta.

The broken peppers pass into perforated rotary reels, where the seeds are separated without use of water (which at this stage would remove excessive amounts of the oleoresin-bearing juice). Then the peppers drop onto another inspection belt, where special attention is given to removal of leaves and stems that would increase the chlorophyll content of the color. This conveyor discharges to another set of reels to insure removal of a maximum number of seeds.

An inclined stainless steel worm next elevates the peppers to an overhead cross-conveyor that leads to a 5-ton/hr. disintegrator (Rietz). Water is added at this point to produce a puree, and this goes to a stainless Sweco screen that separates pulp from the color-containing juice. Pulp is then re-slurried with water and again screened to minimize loss of color in the discarded pulp.

Juice is collected in precipitation tanks where the protein is denatured, resulting in a heavy color-containing curd that settles to the bottom. The supernatant liquor, containing sugars and other undesirable constituents, is removed and discarded. However,

* Patents have recently been granted in the U. S. and six foreign countries.

Fine Points Briefed

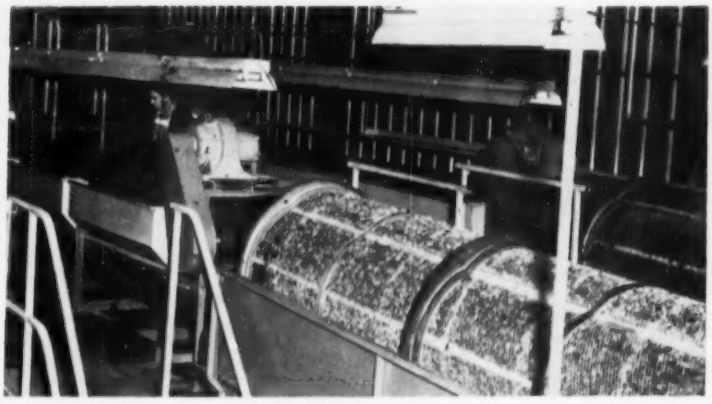
Oil from this new technique is an oleoresin—a term referring to any solvent extract of essential oil plants, fruit, or seed. Usually, waxes are eliminated, since they render the product too viscous, or give a sludge.

Some 20 oleoresins are sold commercially. These include vanilla, ginger, and a number of peppers.

Oleoresin capsicum from pepper is marketed as a source of heat and is extensively used in chili dishes.

Oleoresin paprika is used as a color for prepared meats, dressings, and oleomargarine.

. . . **INSPECTION BELT**, then on to spiked rotary breakers (right) which liberate the seeds.



REELS (rear) separate liberated seeds from meats, discharging latter to belt for final inspection and removal of chlorophyll-containing stems and leaves. Reels in foreground remove seeds not previously separated.

Paprika Color

it does contain valuable products, such as capsaicin.

The precipitated curd, containing about 16% solids, is pumped to a centrifuge (DeLaval ACVO) operating at 6,200 rpm. Here it is concentrated to a heavy (65% solids) cream, which is fed to a 10-ft. long x 5-ft. dia. drum dryer.

Curd Dried, Then Extracted

Liquid from the centrifuge goes to a filter press for recovery of additional solids. Cake produced here is re-slurried and fed to the dryer also.

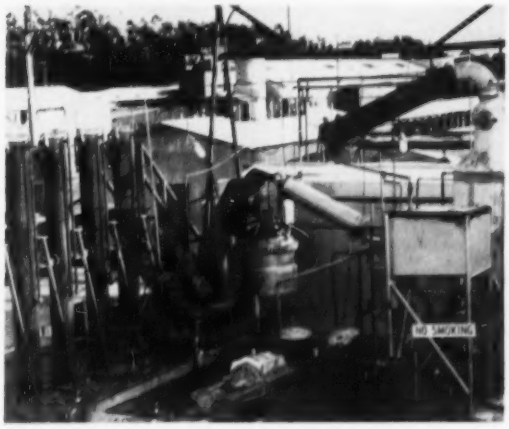
Product from the dryer is extracted with a special acetone (Shell) in percolator-type equipment, resulting in a 15% color solution. Worth noting here are the reasons for selection of acetone over the other solvents tested. These were: (1) Its exceptional solvency (less than 1-lb. per lb. of oleoresin); (2) high purity, and (3) nominal price.

The acetone-oleoresin solution is slurried with diatomaceous earth and pumped to a filter press. Filtered solution then goes to a refrigerated vacuum still for removal of acetone (recovered for future use).

Remaining oil is mixed with an approved antioxidant (to prevent color loss) and packaged for sale.

A high percent of acetone is also recovered from the press cake, which has value as a fertilizer.

DRUM DRYER receives color-containing curd that was previously precipitated from water extract of comminuted meats. It discharges flaked, dried product.



DRIED FLAKES are extracted with special acetone (Shell Chemical Corp.) in columns at left to give 15% color solution. This is filtered in press (foreground). Then acetone is recovered in still (center). Water is removed from oleoresin in the refrigerated vacuum still (right).

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If it's the best you want—then you want "Hamilton," the foremost designers and producers of the finest kettles to mix and cook. There's a "Hamilton" to suit your specifications so why settle for anything but the best, a "Hamilton" Stainless Steel Kettle.

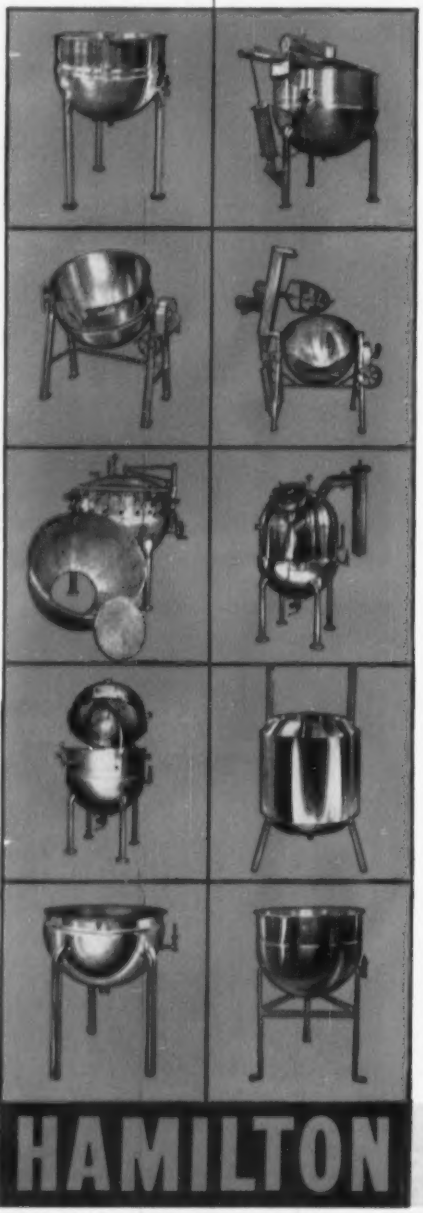
STYLE SA
Streamlined design, balloon jacket. Extra large diameter provides greater heating surface, efficient cooking. Sizes range from 15 to 500 gallon. A.S.M.E. Code constructed for steam working pressures of 40, 90 and 125 pounds.

STYLE CW
Designed to process large batches up to 150 gallons. Positive worm gear and handwheel give complete control of large capacity loads while tilting. Large diameter kettle gives fast, even cooking. Sizes from 30 to 150 gallons.

STYLE PC
Stainless steel pressure cooking kettle, designed especially for meat and poultry processing. Balloon jacket gives increased heating capacity. Built for 90 p.s.i. in jacket and 15 p.s.i. in kettle. Has quick opening latches. Top is lifted by eccentric lever. Sizes 30 to 250 gallons.

STYLE VT
For small batches this unit has no equal. Vacuum cooker with tilting top, easy loading. Sizes from 30 to 150 gallons. Sanitary design throughout. Jacketed for 90 p.s.i. steam working pressure.

STYLE SB
Shallow type kettle with balloon jacket. Streamlined for complete sanitation. A.S.M.E. Code constructed for working pressures of 40, 90, and 125 pounds. Sizes range from 15 to 350 gallons. Larger size kettle can be furnished to meet specifications.



STYLE SA MIX COOKER
Standard SA Mix Cooker has either single motion or double motion agitator with or without hydraulic lift. With hydraulic lift agitator lifts easily and smoothly out of cooker. Sizes range from 30 to 500 gallons.

STYLE CW MIX COOKER
Large diameter gives fast even cooking. Hydraulic Lift tilts agitator smoothly and easily out of tilting kettle. Available for 40, 90, 120 pounds steam working pressure.

STYLE HV
A vacuum cooker for large capacities from 150 to 500 gallons. A hinged manhole is provided for access to the inside. Available with a mixer — circulator can be installed to increase heat transfer and agitation.

CIRCULATOR
Stainless steel steam immersion heating unit can be installed in any kettle regardless of size or shape. Gives extra heating surface at the center of kettle. Creates thermal agitation. Speeds up cooking 45%.

STYLE A
General purpose steam jacketed kettle used in processing food, drugs, and chemicals. Full ¾ jacketed. Sizes range from 15 to 500 gallons. Also available in Type 316 stainless steel or nickel. Larger sizes to meet specifications.

KETTLE SPECIALISTS

HAMILTON

SINCE 1876

DIVISION OF BRIGHTON CORP.... 820 STATE AVENUE ... CINCINNATI 4, OHIO

Efficient Waste-Disposal

—*Continued from page 78*

ducers, pipes, tools, and other equipment.

E. Carting away garbage: The D-D method is used to collect garbage from the cafeteria, using a 4-cu. yd. tilt-type container for daily disposal.

F. Delivering supplies: A special 2-door box (4-cu. yd. capacity) has been designed for carting supplies employed by laboratory and office buildings. Enclosed box is weatherproof and thiefproof.

G. Collecting debris and other waste: Tilt-type boxes carry away sweepings, wood, steel strappings, etc., following freight-car cleanups. The company receives as many as 28 carloads of shelled corn daily, and a similar number of cars must be cleaned for outbound shipments.

Demountable containers, in this case, are set below RR docks.

General debris around the instant-dessert building, starch-processing department, corn sugar and syrup refinery and mill house are collected to be hauled away, once or twice daily, in 4- to 5-cu. yd. capacity tilt-type boxes. Also, accumulations from the electric shop, store room building, woodworking and machine shops. Gleanings, too, are gathered from the corn elevator in 5-cu. yd. boxes and disposed once daily.

A chute serving the 5-story mill house, for example, collects sweepings, corn cobs, kernels, etc., for collection in a 5-cu. yd. container for daily disposal. Nearby, a second chute gathers waste material from cyclones and the roof of feed house (4-cu. yd. box, daily disposal).

H. Gathering paper: Waste paper from dry starch department, scrap bags from lactic acid building, and kraft paper from dextrine department go into 5-cu. yd. containers for once or twice-a-day disposal (scrap-paper salvage).

I. Disposing filter aid: Spent residues from filter presses in the lactic acid and refinery buildings are chuted into 5-cu. yd. open-top, tilt-type boxes for twice-a-day disposal. Formerly, this messy waste was chuted into the yard and shoveled into trucks.

FE gratefully acknowledges the help and cooperation of Gerald Horton, Jr., of A. E. Staley Mfg. Co., Decatur, Ill.; W. A. Jacob, of Anderson, Clayton & Co., Food Division, Dallas; and J. J. McCabe of American Maize-Products Co., Roby, Ind., in compiling this report. —*End*

ANTI-CAKING AGENTS

★How Evaluated

★ How Applied

FLOWABILITY is determined by placing 50g. portions of treated crystals in shakers, inverting and mechanically shaking for 60 sec.

After you have established conditioner's efficiency and ability to adhere, care in blending is called for to prevent degradation

JACK WATSON

Director of Market Research, J. M. Huber Corp., New York City

PRODUCTS such as salt, powdered sugars, and seasonings often become sticky and lump or cake into larger aggregates so that they cannot be effectively or economically used.

These difficulties can be minimized or overcome by addition of certain inert materials that serve as parting or coating agents, carriers, diluents, or in other ways condition the product.

In the case of table salt, these conditioners function by selective adhence to the surface of the crystals. They are effective moisture barriers because they preferentially absorb any moisture coming in contact with the mixture.

To function properly, however, they must adhere to the surface of the salt crystals, since any unattached conditioner results in free agglomerates, which not only retards flowability, but also selectively deposits out during handling. Overconditioning will also act in the same manner.

Flowability Tests

One of the important criteria for checking efficiency of a conditioner is flowability.

The measurement can be made by adding increments of moisture to dry conditioned salt and establishing a flow pattern at the varying moisture levels.

Test samples are made by blending 1,000g. of unconditioned salt with a known amount of conditioner for 2 min. in a laboratory Patterson-Kelley blender. Then 200g. are weighed out and water is added to attain the desired moisture levels.

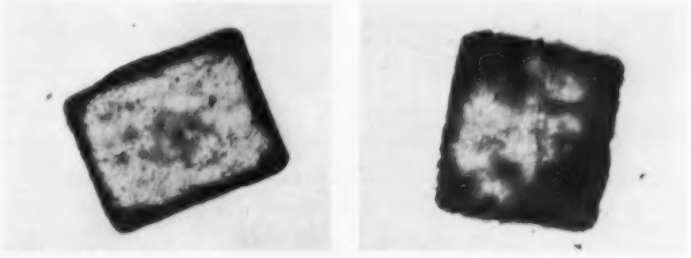
From these samples, 50g. portions are taken and placed in salt shakers, inverted and vibrated for 60 sec. on a Boerner shaker (see photo above). Amount of salt flowing through is calculated as percent flowability. Flow data obtained from this test procedure are plotted as flowability curves (Fig. 1).

To compare the efficiency of various conditioners, it is necessary to select a reference flowability above which the salt is protected and below which it is not. This would be the flow of unconditioned salt as produced (40% in Fig. 1).

When this salt is dried to zero moisture, the flowability increases slightly, to about 52%. But when the moisture level is increased to only 0.1%, it drops to 17%. Then 0.25% of conditioner is added to the dried salt, followed by various amounts of moisture, and flowability tests at each moisture level. This procedure is repeated at various conditioner levels.

Points at which curves intercept the reference line are plotted to give a rating curve. Then the foregoing procedure is repeated with other normally used conditioners. These curves (Fig. 2) graphically illustrate the efficiency of each.

For example, at equal levels,



MICROPHOTOGRAPHS of salt crystals show the sharp, clear edges of untreated ones (left), and the fuzzy-appearance produced by blending with 1% conditioner for 30 sec. (right).

Zeolex (trade name for our conditioner) and calcium silicate have twice the flowability of magnesium carbonate. Also illustrated is the fact that twice as much $MgCO_3$ is required to provide the moisture protection afforded by our Zeolex and $CaSiO_3$.

Adherence Tests

Once degree of moisture protection has been established, the conditioners must be evaluated for their ability to stick to the salt. Poor adherence is reflected in excessive dustiness.

This is determined by subjecting the conditioned salt to a severe vibratory screening for 30 sec. on an Eberbach shaker. The separated material is reported as percent dustiness or conditioner separation.

Fig. 3 shows relative degree of dustiness for various conditioners. The lower the dustiness, the greater the adherence and, therefore, the more effective coating of the crystal and better dispersion and blending.

But dusting-separation is not necessarily a characteristic that can be attributed directly to the conditioner. It may also be governed by a complicated inter-relationship between unconditioned salt moisture and temperature, and conditioner moisture.

Blending Is All Important

Type and degree of blending are often the neglected phase of salt conditioning. Therefore, it is essential to not only consider the various physical and chemical aspects of the conditioner and the crystal, but also the mechanical phase of the blending operation.

A good conditioner will produce optimum coating in less than 1 min., provided the blending action is gentle and thorough. Naturally, the equipment must be operated under suitable conditions. Excessive blending or handling, even though gentle, results in rapid degradation of the coating.

However, even after extensive laboratory evaluations, it is necessary to make the laboratory-to-plant transition using blending equipment designed for maximum conditioning efficiency.

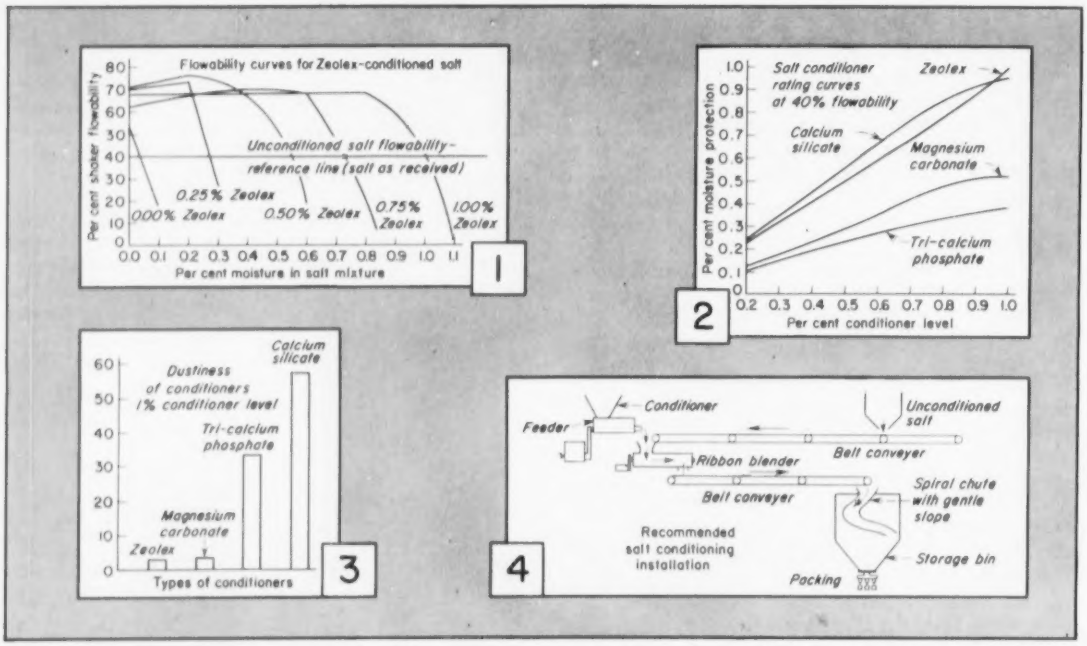
Basic design principles for efficient and optimum conditioning are shown schematically in Fig. 4. Here we have the unconditioned salt issuing from the storage bin onto a belt conveyer, and discharging to the blender. Conditioner is added by a chemical feeder, and blending action is gentle and of short duration.

From the blender, the conditioned salt is conveyed to storage bin or to packing hopper. To avoid separation and segregation, free fall must be minimized. A spiral or other slide is used to ease product into bin.

Direct packing is desirable, but if a number of storage bins are involved, a belt conveyor should be introduced to carry the conditioned salt to the packer. Secondary design characteristics, such as size, horsepower, and capacity, can be engineered for plant through-put.

From the above it is apparent that conditioning is not a simple mixing operation. Rather, it is a technical application of scientific principles investigated and evaluated in the laboratory. And it is concerned not only with the physical and chemical properties of the crystal and conditioner but also with the mechanical phase of the operation.

Rating Conditioners, and How They're Applied



FIGS. 1-4. Flowability curves are made for different percentages of each conditioner (Fig. 1). Points where these cross 'ref' line provide moisture protection data for rating charts shown in Fig. 2. In Fig. 3, the bars show factors of dustiness when conditioned salts were subjected to severe vibratory screening. Fig. 4 is recommended installation for production of conditioned salt. Product is fed from storage bin to belt that discharges into blender. Here conditioner is added by a chemical feeder and, following gentle mixing for a short period, treated salt is conveyed to storage or packaging. To minimize free fall and consequent separation, a spiral chute is used to convey product from belt to storage bin.

You get *widest container variety* from

USS

From 2½-gallon pails to 55-gallon drums – including stainless – U.S. Steel offers the widest industrial container selection of all. Chances are there's a container here that's best for your needs. Your U.S. Steel representative will be glad to help you select the right one.

Profit from all 5 of these U.S. Steel extras, too:

- **Eye-catching containers** – your containers not only ship your product, but advertise it, too – when color-decorated by U. S. Steel.
- **Best rust protection** – there's more zinc phosphate on every USS rust-inhibited container.
- **Prompt container delivery** – a 7-point factory system gives you next-door service anywhere – any time.
- **Personalized container service** – your U. S. Steel salesman makes it his business to understand yours – to help you get the right containers for your needs.
- **Longer container life** – extra zinc phosphate gives your containers a safer, longer lifetime.

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USS

UNITED STATES STEEL

For more data, circle this page number on card at back →

CENTRALIZED CONTROL PANEL provides finger-tip data-gathering and adjustment of plant heating and air-conditioning systems. Additional panels monitor master-light switching, electrical control, and fire detection. There are sections for primary air, heating-cooling, refrigeration, and interior-zone control. Graphic diagrams show system checkpoints and schematic layout of plant. Unit features telephone dialing for checking various room temperatures.—Minneapolis-Honeywell Regulator Co., Minneapolis.

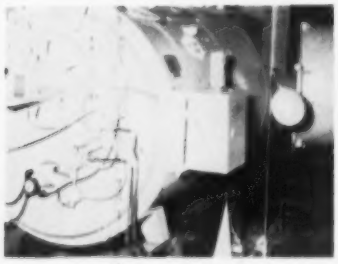
12 Advanced

Latest instrument-control techniques, plus newest equipment for heating, ventilating, humidifying, air-cleaning, and blending, attract wide interest at Chicago Heating & Air-Conditioning Show.

5 Units for Heating

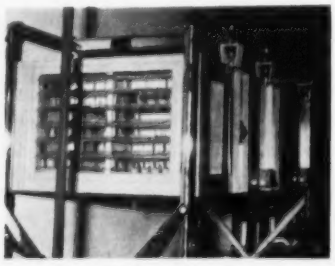
PACKAGE STEAM GENERATOR for hot-water heating systems accepts recirculated water with wide temperature differentials. New combustion method employs entire firetube-heating surface. First pass through tube delivers 65-70% fuel value. Single pass of return tubes uses heat of residual gases for additional 15-20% efficiency—National U. S. Radiator Corp., Oswego, N. Y. (88B)

COMPACT AIR HEATER is high-Btu. counterflow unit with induced-draft, dual-fuel burner. High-velocity discharge generally precludes need for ductwork. Unit may be suspended vertically or horizontally. At rated capacity, temperature of heating surfaces (stainless and aluminized steels) does not exceed 75% of scaling temperature.—Dravo Corp., Machinery Div., Pittsburgh. (88C)



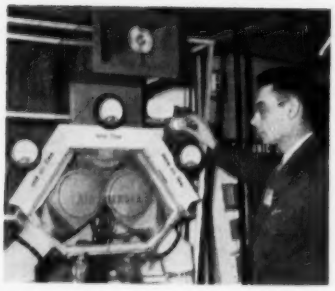
PACKAGED BOILER for steam and hot water has forced-draft blower. This provides complete combustion and eliminates need for stack. Combustion gases make four high-velocity passes. Heating surface is 5 sq. ft./bhp.—Cleaver-Brooks Co., Milwaukee. (88D)

NEW pressurized overhead gas heater offers sealed combustion system with fully automatic electric ignition. It operates independently of room air.—Norman Products Co., Columbus, Ohio (88E)



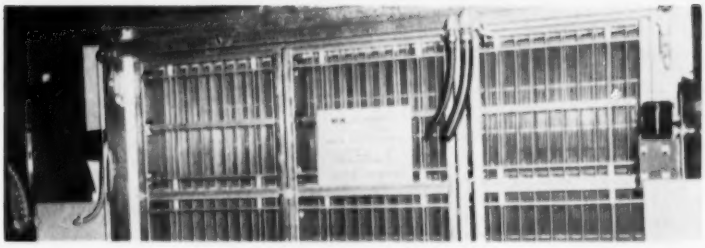
AIR-HEATING and ventilating unit (1,400 cfm.) develops 120,000 Btu. Sectional design offers units in 275 combinations and 9 sizes for various applications, including humidification. Capacities range 1,150-36,000 cfm., and 50,000-1,900,000 Btu.—Trane Co., La Crosse, Wis. (88F)

Units For Plant Engineering

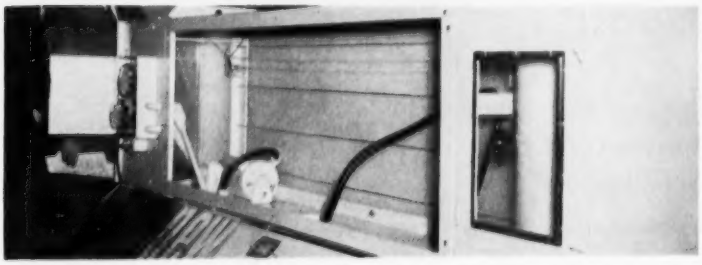


SPACE-TEMP CONTROLLER blends hot and cold air from two ducts, and provides constant flow regardless of duct pressures. Return and outdoor air streams are mixed, cleaned, humidity-conditioned, and fed to two ducts, where heating and cooling coils bring them to desired temperatures. – Minneapolis-Honeywell Regulator Co., Minneapolis.

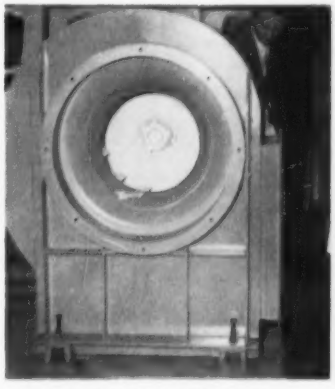
4 Latest Air Systems



AUTOMATIC air-filtering system employs 65-ft. strip of Fiberglas, which feeds from one roll onto another. Timing is pre-set at factory for different atmospheric conditions, and it's so controlled that 6 in. of filtering medium is delivered per cycle. Latter ranges 25-60 hr.—Manufacturer: Illinois Engineering Co., Div of American Air Filter Co., Chicago. (89A)



ELECTRONIC AIR CLEANER, with automatic cold-water washing system, offers 50% greater capacity, takes 69% less floor space, has 33% smaller face area. Less ductwork and absence of high-voltage wiring cut installation cost. Capacities range 1,920-116,500 cfm., face areas from 5.56 to 194.0 sq. ft.—Westinghouse Electric Corp., Boston. (89B)

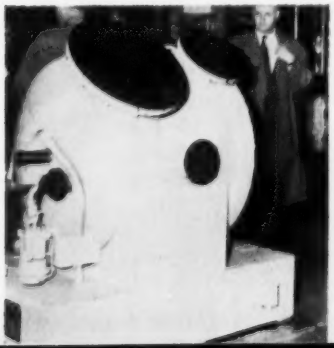


HIGH-VELOCITY FAN for air conditioning systems has 7,000-15,000 cfm. capacity. Special construction includes large shaft and bearings, heavy wheels, and reinforced housing. Units are available in single- and double-width arrangements, sizes 18-73 in. —Trane Co., La Crosse, Wis. (89C)

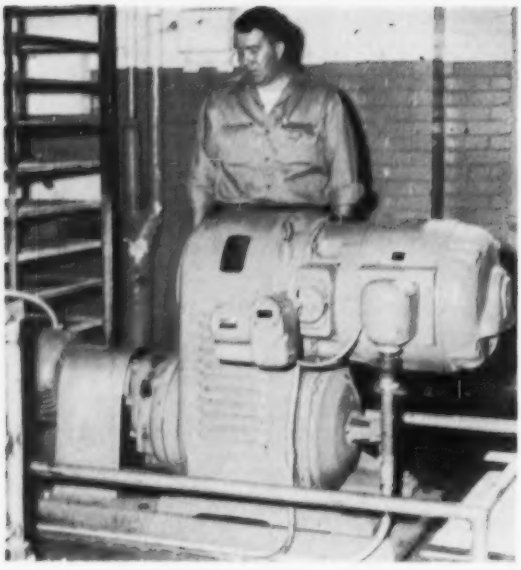
Compressor, Ducting

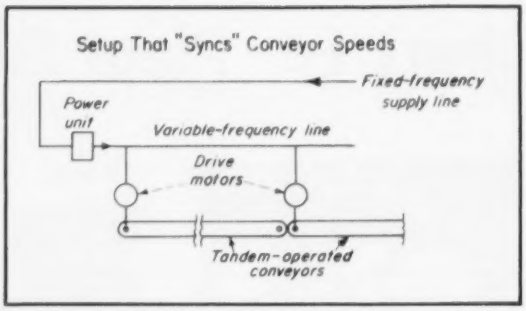
TWO-STAGE open-type centrifugal compressor has 120-2,000-ton capacity. Vaneless diffusor-type unit employs vertically split casing, aluminum-alloy impellers.—Worthington Corp., Harrison, N. J. (89D)

FIBERGLAS LAMINATE (3 ply) is used between non-corroding metal in flexible ducting for high- and low-pressure air conditioning.—Flexible Tubing Corporation, Guilford, Conn. (89E)



For further data on these up-to-the-minute machines, circle key number on Reader Service Card in back of book.





SECTION SKETCH of 825-ft.-long bakery conveyor-cooling system shows how power unit is positioned to control drive motors—thus achieving equal and simultaneous speed changes.

COMPACT POWER UNIT (15-hp.) provides variable-speed control of 14 conveyor-drive motors in bakery's top-efficient cooling operation.

New Multiple-Drive System

Sharpens Control of Your Product Flow

It's keyed by a versatile power unit that converts a series of induction motors to variable-speed operation. Thus drive rates readily may be varied—equally and simultaneously . . .

Precision cooling application in bakery detailed

CLARK PULVER and JOHN V. ZIEMBA

President, Velton & Pulver, Inc., Chicago Ridge, Ill.; and Associate Editor, "Food Engineering"

ONCE AGAIN it's been demonstrated that "easy does it"—this time in the vital engineering of modern continuous product flow.

The new stride is a simple electrical technique for coordinating multiple drives, thus automatically gearing product flow to variable process requirements.

And it's notable that this method of control may be applied to many different unit operations.

Illustrating the important economies is the setup at Oswald Jaeger Baking Co., Milwaukee, where the new system is used to synchronize the tandem operation of multiple conveyors used for precision cooling of vari-sized baked goods.

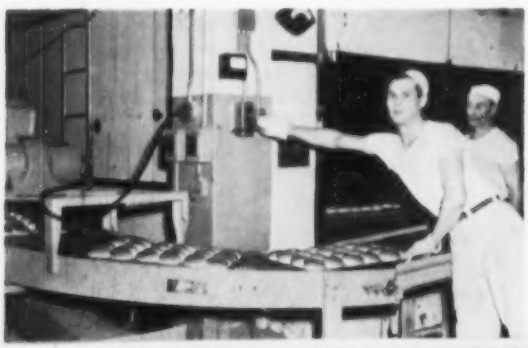
Before detailing this installation, however, let us look closer at the ingenious equipment.

Key to the system (Varidyne, U. S. Electrical Motors Inc., Los Angeles) is a compact power unit consisting of a drive motor and an alternator. In providing a triple action:

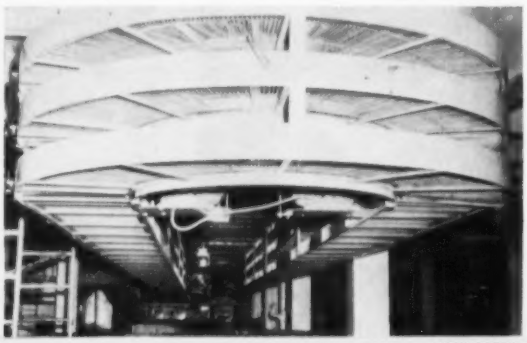
1. **It converts standard 3-phase induction motors to variable-speed drives.**

2. **Synchronizes their operation by permitting equal and simultaneous speed adjustment.** (*Turn page*)

PUSHBUTTONS in new drive system control speed of conveyor taking buns from oven. After initial forced-air cooling to about 170F. (far left), the goods go to . . .



. . . **MULTI-TIER CONVEYOR,** which is suspended from ceiling. This unit permits further cooling to about 95F., proper temperature for slicing the buns.



a **health plus**
on your label...

helps put **your product** on the table!

fortify your frozen foods with

PFIZER VITAMIN C

● Today's health-conscious consumers will find extra sales appeal in your frozen packs when you include the words "VITAMIN ENRICHED" on your label. This competitive advantage costs you surprisingly little with Pfizer Ascorbic Acid (Vitamin C).

A natural food ingredient, ascorbic acid not only gives vital nutritional value, but also protects fresh flavor and color against oxidation damage...such as "browning" and flavor loss in the case of many types of fruit, or "rusting" in the case of the fatty portions of fish.

If you are primarily interested in protecting your packs against the effects of oxidation, Pfizer also offers new, *low cost Isoascorbic Acid* which has all the antioxidant effectiveness of ascorbic acid U.S.P., but which does not give vitamin fortification.

Write the Pfizer Chemical Sales Division if you would like detailed information on how to use Pfizer Ascorbic Acid and Isoascorbic Acid in processing frozen foods. Build your sales with a health plus on your label and extra protection in your packs!

CHAS. PFIZER & CO., INC., Chemical Sales Division, 630 Flushing Ave., Brooklyn 6, N. Y.
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Quality ingredients for the food industry for over a century

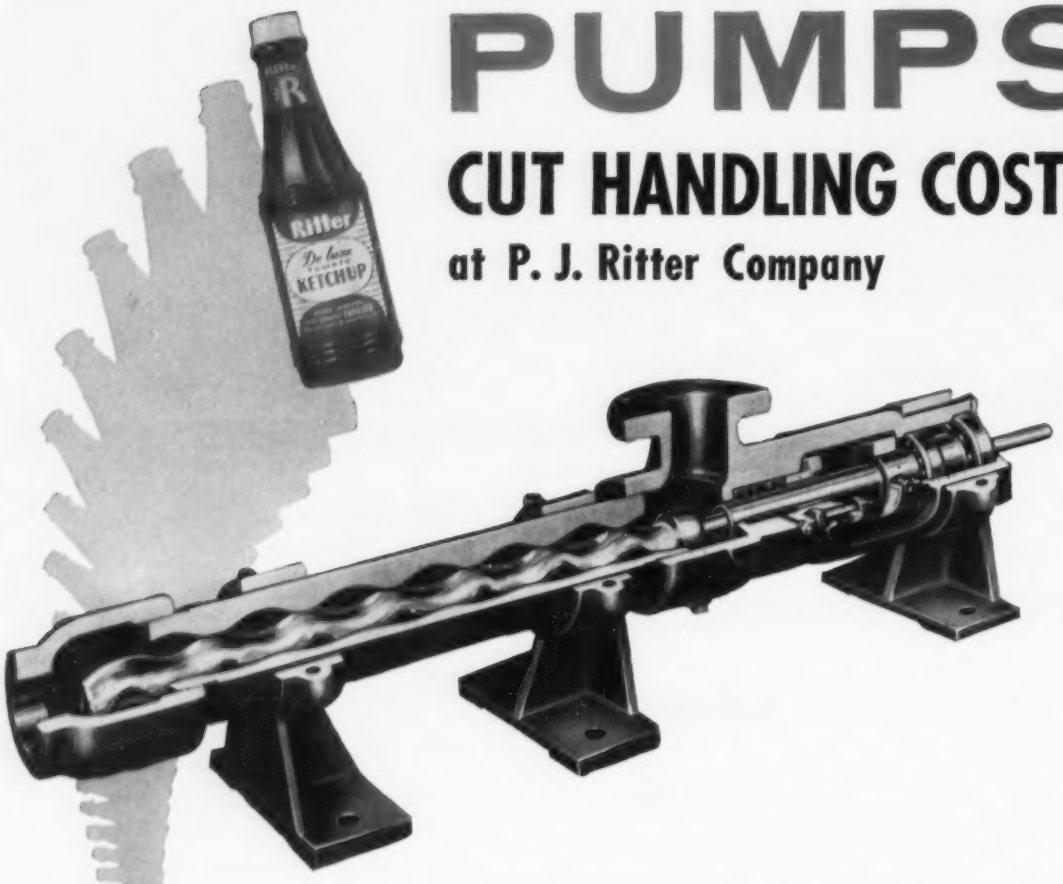
Pfizer

For more data, circle this page number on card at back →

MOYNO® PUMPS

CUT HANDLING COSTS

at P. J. Ritter Company



...pumping tomato seeds and 5-15% water

The Moyno "progressive cavity" pumping principle has enabled thousands of plants to pipe difficult materials that were transported by hand and other expensive means. For example, The P. J. Ritter Co., famous food packers since 1854, have increased efficiency by installing seventeen Moyno Pumps. The one shown at the left is pumping tomato seeds in 5-15% solution at 10 gallons per minute. The pump runs at 600 RPM.

Moyno is the only pump that will handle many difficult materials such as abrasives, pastes, slurries, chemicals, foods, suspended solids, etc., without foaming, aerating, crushing or excessive pump wear.

Examine your processing methods. No doubt there are several places where Moyno Pumps can drastically cut costs. Ask us, we'll give you a prompt answer. Send us an outline of your problem today! Write for Bulletin 30-FE.

ROBBINS & MYERS, INC.

SPRINGFIELD, OHIO | BRANTFORD, ONTARIO

Motors | Fans | Hoists | Moyno® Pumps | Propellair® (Industrial) Fans

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3. Equalizes load distribution when drive motors operate in tandem. This curbs equipment breakdown, also eliminates the need for 'overdesigning' the drive elements for higher loads at any one point.

Here is the operating principle by which all motors in a system are linked electrically:

Speed of an a.c. motor is proportional to the frequency of applied power. Thus if a unit operates at 1,800 rpm. on 60-cycle current, it will run at 900 rpm. on 30 cycles, and at 3,600 rpm. on 120 cycles. Power lines, however, operate at constant frequency, so an induction motor normally has fixed speed.

To permit speed variation, the alternator of the power unit, which is driven at variable speeds, generates a variable-frequency current and transmits it to each motor.

Now for details of the Jaeger installation, where efficient conveyor-cooling of baked goods replaced the old rack-cooling method:

Employed in Jaeger's new system are 14 double-reduction gearmotors and a total of 825 ft. of cooling conveyors that extend from oven to slicing machine.

Conveyor speeds are synchronized by a 15-hp. power unit located behind the oven, and operating on a 220v., 60 cycle, 3-phase circuit. Motors range in size from ½ to 1 hp., with speeds to 107 rpm., and in ratios up to 5:1.

Coordination of the speeds of the cooling belts is vital because this bakery produces a variety of soft rolls (2½ to 5¾-in. dia) and hearth-baked ryes (1, 1½, and 2 lb.). Each item requires a different cooling time which, in turn, calls for varying the speed of each conveyor—equally and simultaneously.

This flexibility has provided eight impressive benefits. Specifically, the system now:—

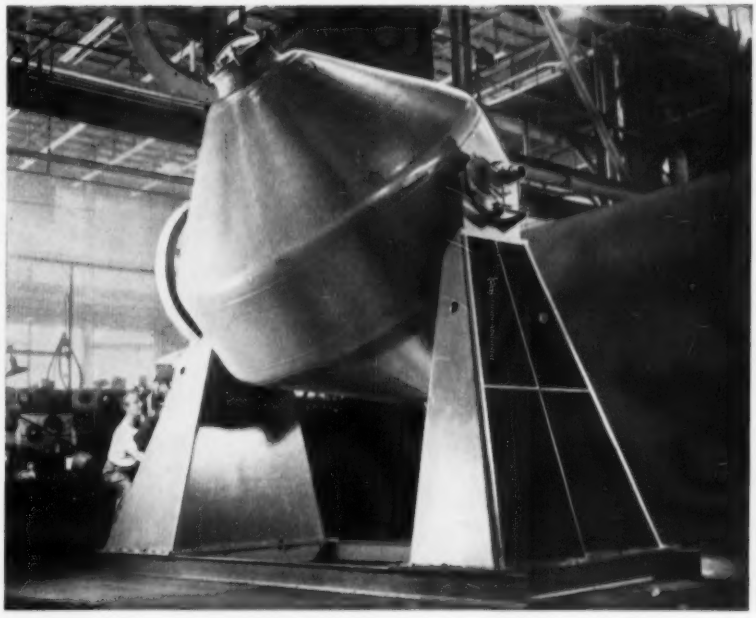
. . . **Serves as a pacemaker.** Formerly, manual handling of racks governed the speeds of cooling, slicing, and packaging. Today, items leaving the oven are packaged within 20 to 40 min., instead of the several hours previously required.

. . . **Saves on extra handling.** Eliminated are the time-consuming steps of loading pans of hot buns onto racks, transferring them to a cooling area, and then to a manual dumping station.

. . . **Steps up output.** Cooling is no longer a bottleneck. Products are now cooled in-process, without production delays.

. . . **Assures uniform cooling.** Internal temperature of cooled buns

(*Turn to page 185*)



Do separate drying and blending of your product take days rather than hours?

Look then to Pfaudler and the conical dryer-blender with which you can dry and blend the same materials in a *single* operation—and cut processing time from days to *hours*. Also, you save substantially on labor costs, since the wet product is introduced directly—eliminating intermediate materials handling.

Unique tumbling action

The Pfaudler dryer-blender works on a similar principle as an automatic clothes dryer. Your wet materials are "tumbled" so that more surface area is exposed to heat and air, and the entire operation takes place under vacuum. Product comes out dry in only a fraction of time with conventional dryers.

This same action also mixes materials thoroughly to produce a homogenous product.

Product purity protection

You can handle the most corrosive materials safely and without affecting product purity because this dryer-blender with its glassed inner surface protects your product against metal contamination. The smooth surface of Pfaudler glass facilitates quick and thorough cleaning with *no* residual product adherence. For more information on the *conical dryer-blender* and other integrated process equipment from Pfaudler, check coupon.

THE PFAUDLER CO., Dept. FE87, Rochester 3, N. Y.

Please send bulletins on the ☐ Conical Dryer-blender and this other Food Processing Equipment by Pfaudler: ☐ Heat Exchanger ☐ Tanks—Mixing and Storage ☐ Titan Superjector ☐ Filler—Rotary Piston Type ☐ Evaporators—Film Type.

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

For more data, circle this page number on card at back →

HIGH SPEED packager (left) utilizes forming drum, heat lamps, and a special film laminate to turn out tight, vacuum-packed pouches of sliced meat (as above). Note slim heat seal seams that give maximum economy of packaging material, yet good closure strength.

Vac-Pack Speed Boosted

Automatic unit ups output per man-hour 50% and achieves 50% savings in wrapping material—a dual economy for large-scale packers of food products using vacuum or inert-gas techniques

ROBERT J. KELSEY
Assistant Editor, "Food Engineering"

LARGE VOLUME FOOD PACKERS—seeking to boost production rates on inert-gas and vacuum packaging lines for meat, cheese, and frozen foods—have a new ally in a speedy packager that has upped output per man-hour half again in its first plant trial.

The continuous, automatic device handles standard 4x4-in. packages in single or twin-pack arrangements at 60 units per min. But further, it will also wrap 4x8-in. products—such as Canadian bacon, swiss cheese, sliced ham, and various shingled products—at 30 packages per minute.

In addition to this speed and flexibility, the new machine (made by Standard Packaging Corp., Clifton, N. J.) cuts the usually wide heat-seal ears to a mere ¼ in. lip—a reduction that the manufacturer claims saves 50% on packaging material.

Primary installation for this rotary packager is at the Taylor Provision Co., Trenton, N. J. Here, the unit is used for vac packing a line of sliced meats.

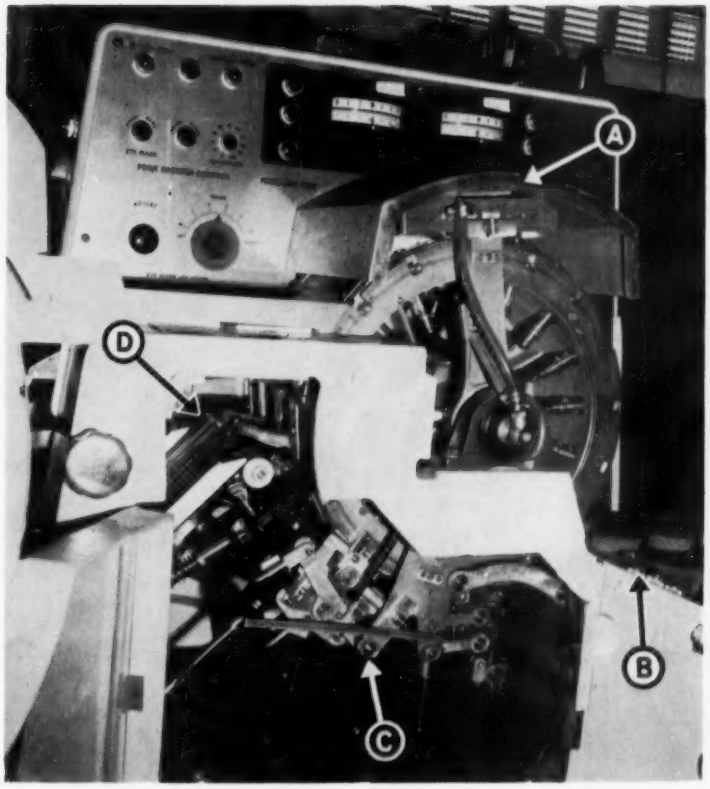
In operation, meats are cut on a standard Anco slicer and stacked with an automatic attachment. Women checkweigh the stacks and place them in a pocketed conveyor that is synchronized to the packager.

Meat Is Sandwiched In Film

Meanwhile, a film web is tracked into the machine over a series of cavities, mounted in a double row on a drum. As the drum revolves, the film is drawn under a battery of powerful heat lamps (440v.). These soften the packaging material, which is then drawn tightly into the cavities by vacuum nozzles.

On the line, sliced-meat stacks are transferred from the pocketed conveyor to a second film web, which is drawn against the drum—compressing the meat into the cavities.

A bar-type thermoplastic heat sealer closes three sides



ACTION in film wrapper starts at (A), where heat lamps soften laminate and vacuum draws web into drum cavities. Meat stacks enter unit on second web at (B). Heat sealers (C) close packets as vacuum nozzles exhaust air. Rotary vacuum cups (D) eject packages to cartoning machine.

By New Rotary Packager

of the packages, then vacuum tubes exhaust air from the pouches. A second heat sealer, combined with a reciprocating knife, completes the package closure and separates the two lines of packages into pairs. At Taylor, a second stationary knife splits the pairs into single pouches.

The vacuum nozzles, which are all mounted in the drum, exhaust to a central header in the drum axle. The heat sealers are so pivoted that they travel with the drum for a few inches when contacting the film—insuring the necessary dwell time and a firm heat seal.

Finally, rotary vacuum cups suck the packages from the cavities and discharge them down a chute to a carton set-up machine (Container Equipment Corp., Newark, N. J.). Here, workers slide the pouch packages into tuck cartons (Crescent Box Corp., Philadelphia) that are automatically opened and closed by the machine.

Though the film packager is officially rated at 60 packages per min., Taylor has hit 75 per min. during high-speed runs. But the machine's main benefit has been its dramatic increase in output performance.

Previously, the company employed 17 workers on a single line composed of two Standard Packaging machines (an 8-head rotary unit and a 2-head stationary model). In contrast, the new line operates with only 13 employees and yields better than 14% extra production—which works out as a solid 50% gain in output per man-hour.

Film Laminate Guards Quality

High vacuum protection of foods is not dependent on machine efficiency alone, of course. Here, the film laminate used has a great deal to do with maintaining high product quality during the four-week-plus shelf-life necessitated by the company's wide distribution range.

The material is composed of ½ mil polyester film, extrusion-coated with 2 mils of polyethylene (Standard Packaging). The combination adds the high gas and vapor-barrier characteristics of polyester to the easy heat-sealing advantages of polyethylene (which also provides additional barrier properties).

While Taylor does not use a printed packaging material, the packaging machine is equipped to register one film web. And various other controls insure accurate operation of heat-sealing bars and close control of the heat lamps and film.

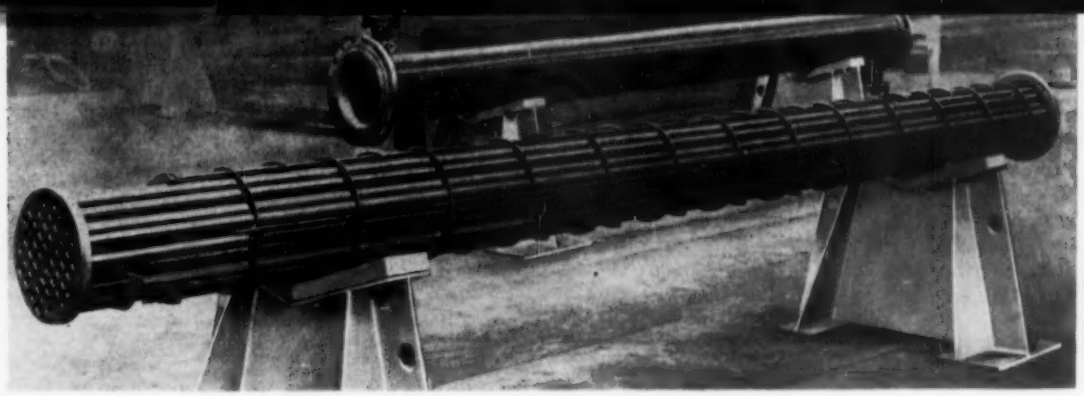
Here is Why!

You can dispense with oil filters and dust filters when you install ®Nash® Clean Air Compressors. You can save the cost of maintaining these devices. You can greatly reduce instrument maintenance costs. For the Nash employs no internal lubrication, therefore no troublesome oil is in the delivered air. Moreover, air from a Nash is thoroughly washed and cooled as it passes thru the pump. Dust in the plant atmosphere, even fly ash, is immediately removed.

®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

No oil filters.
No dust filters.
No internal lubrication to contaminate air handled.
No internal wearing parts.
No valves, pistons, or vanes.
Non-pulsating pressure.
Original performance constant over a long pump life.
Low maintenance cost.

NASH ENGINEERING COMPANY
395 WILSON, SO. NORWALK, CONN.



STRUCTURE of corrosive-fighting titanium, this heat exchanger offers a forecast of numerous practical and profitable food-industry applications of the metal. Specific use of unit pictured: Cooling of 15% solutions of sodium hypochlorite.

Why Not Try Titanium?

You'll find it can solve many of the toughest corrosion problems. Besides, it has high strength while saving on weight, also minimizes temperature-change distortions, and is easily cleaned

DR. H. B. BOMBERGER, G. T. BEDFORD, and R. M. LORZ

Respectively, Research Supervisor and Marketing Department Staffmen, Rem-Cru Titanium, Inc., Midland, Pa.

KEEPING FOOD EQUIPMENT free from corrosion is a large order. So large, in fact, that several cost-conscious food processors have established permanent corrosion committees.

This continuing engineering effort has a double objective—not only protection of equipment but also curbing food contamination.

In the handling of certain foods—catsup, seafood, cranberries, and pickles, to name just a few—the problem is accentuated.

But a bright new hope is offered by titanium, now being employed in a number of experimental applications. True, it will be some time before final results are verified. However, real promise is in the offing, along with good chances of substantial reductions in the price of the metal.

Titanium has five major properties making it attractive for many troublesome food field applications:

▶ **Corrosion resistance:** Titanium withstands some of the chemicals normally considered most corrosive. It also resists attack by the following acid products and foods: Acetic, lactic, citric, and stearic acids; coffee; tea; lard; vinegar; onion, pineapple, and grapefruit juices. And it is not adversely affected by sodium hypochlorite solutions, hot or cold.

▶ **High strength-to-weight ratio:** This means lighter mobile equipment and less floor weight for stationary units.

▶ **Low coefficient of thermal expansion:** Results in lower stresses and less likelihood of distortion due to heating or cooling.

▶ **Great strength and stiffness:** Allows extremely thin, light sections to be used.

▶ **Easy cleaning:** Food does not tend to stick to titanium.

Corrosion Resistance Highlighted

Protection for the metal is believed to result from the formation and maintenance of a surface film of stable oxide or chemi-adsorbed oxygen. Oxygen and oxidizing agents, present as impurities and minor components of commercial solutions, are normally highly corrosive, but they add to titanium's protective film.

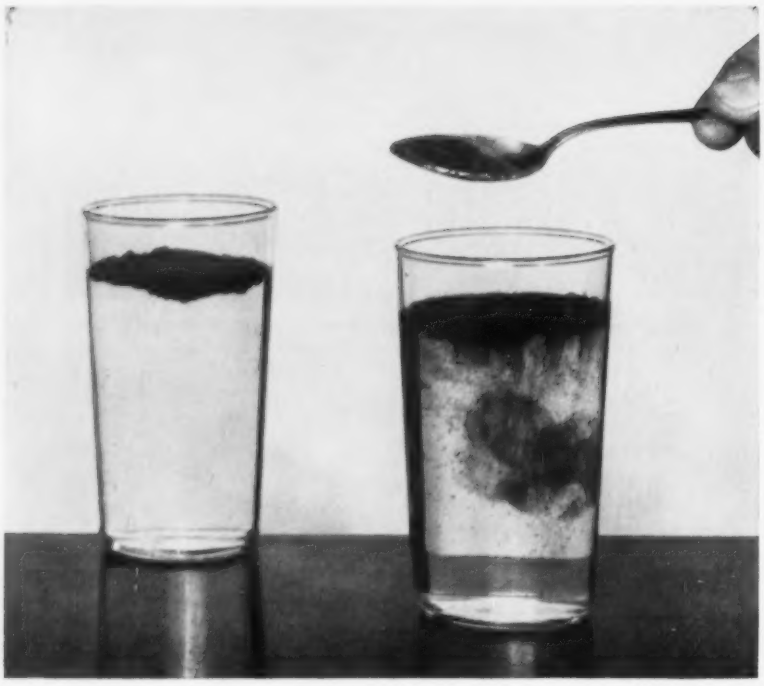
Easy polarization also helps to

HOW TITANIUM STANDS UP

—Under Corrosive Influences of Food Acids, and Cleansing Agents and Sanitizers

Corrosive Testing Agent	Concentration (% by Weight)	Temperature (Deg. C.)	Rating*
Acetic acid	5 to 99.5	boiling	A
Calcium hypochlorite	2, 6	100	A
Chlorine saturated water	.....	room	A
Citric acid, aerated	10, 25, 50	100	A
Citric acid, non-aerated	50	boiling	B
Lactic acid, aerated	10 to 85	100	A
Lactic acid, non-aerated	10–100	boiling	A
Phosphoric acid	5 to 30	35	A
	35 to 85	35	B
	5 to 35	60	B
	5	100	B
Sodium chloride	20, saturated	boiling	A
Sodium hydroxide	10	boiling	A
	40	80	A
Sodium hypochlorite	5.6% Cl_2	room	A
Stearic acid	100	180	A

* Used here are *Corrosion Handbook* letter ratings: "A" means corrosion of not more than 5 mpy. (mils penetration per year), while "B" implies 5 to 50 mpy. A "B" rating may be satisfactory where some corrosion may be tolerated.



DOES WETTABLE COCOA INTEREST YOU?

What you see above is *pure* cocoa that has been solubilized by a very simple process

The new Blaw-Knox Instantizer and Solubilizer are able to do amazing things to many types of powdered foods among them, making cocoa wettable.

Perhaps your product is in this list. They all can be made at high production and with excellent quality.

WETTABLE COCOA FOR SALE TO OTHER PROCESSORS
VARIOUS CUSTOM BLENDS
INSTANT BREAKFAST COCOA
CHOCOLATE DRINK POWDER
CHOCOLATE MALTED MILK POWDER

The Blaw-Knox Instantizer performs a process of agglomerating a powder or dry-mix to make a homogenous type product with a decreased bulk density. Its ability to be reconstituted with ease really alters most user's concept of the description "Instant."

FOR FURTHER DETAILS AND LITERATURE, CONTACT: DEPT. FE

BLAW-KNOX COMPANY
DAIRY EQUIPMENT DIVISION
MORA, MINNESOTA

stem corrosion. Net result is a decrease of current flow in galvanic corrosion cells, and a consequent decrease in corrosion.

This partially explains titanium's superior resistance to many chemicals and the fact that it may be used with some metals without risking harmful galvanic effect on either.

When titanium is attacked, corrosion is uniform. Little or no pitting or other localized attack can be observed. This has been graphically demonstrated by parts that were fabricated for a filter-press unit producing solid cakes from highly corrosive hypochlorite slurries.

Previously, pitting occurred in one or two weeks. But the titanium unit has operated for seven months without evidence of corrosion.

At this early date, food processors are naturally wary of definite commitments. But the first steps have been taken and titanium installations are now being performance-tested on an ambitious scale.

How does this relatively new metal resist attack by tomato soups and sauces, pickles, brine, and fruit juices? How about titanium's service life? Still watching and tabulating, the food processor says, "No comment yet."

On the other hand, titanium pioneers contend their metal is practically unaffected by these products—and point to actual corrosion tests as proof. Meanwhile, titanium's excellent performance in other industries is considered as auguring a broader use in food processing.

In a chemical-industry application, for instance, titanium is serving with outstanding success. Here, the metal is being employed in thermowells holding dilute nitric acid and nitrogen oxide at above 400F.

Formerly, the units failed every six months. And each failure cost $1,500 in lost production and replacement labor. Thus far, the new well has been in operation a year. However, its full service life, based on corrosion tests, is reckoned at five years. Expected savings: $13,500.

Those who are eyeing titanium for possible future use will have thoroughly investigated its "high cost." The quote marks indicate that the initial greater cost doesn't tell the whole story.

There's no denying that, to start with, the cost of a pound of titanium sheet runs some 17 times higher than 316 stainless steel. But considering the cost on a square-foot basis, the margin narrows to 9 times. This is credited to the low density of titanium.

Further assuming that the cost

← For more data, circle this page number on card at back

NOW! LOW COST MODULATING CONTROL FOR TEMPERATURES UP TO 600° F

ANOTHER NEW IDEA FROM FULTON SYLPHON

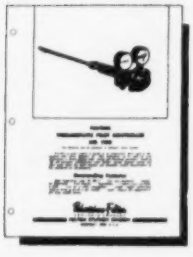
New FULTROL Thermostatic Pilot Controller No. 1100-C & D

Here is another example of how Fulton Sylphon gives you the best temperature control for your process at the lowest possible cost. This time it's an all-new FULTROL Thermostatic Pilot Controller—a simple, compact unit that now enables you to control temperatures up to 600° F. with *proportional* accuracy, but at *on-off* cost.

All that FULTROL needs is an air or other supply at a constant pressure anywhere between 18 and 40 psi. From then on, FULTROL strait-jackets temperature by modulating the output pressure to a final control valve, damper, or other device. FULTROL does all this by means of a simple, stainless steel thermal element. There are absolutely no troublesome pivots or levers.

What's more, you get all these extra features in the bargain:

- Instant knob adjustment of control setting over any 200° range specified between —50° F. and 600° F.
- Easily adjustable proportional band from 5° to 25° F.
- Protection against over-run temperatures (100° above range limit)
- Resistance to pressures up to 300 psi.



SEND TODAY FOR CATALOG SHEET NO. 10-28-PG

Mr. Controls

Robertshaw-Fulton CONTROLS COMPANY

FULTON SYLPHON DIVISION • Knoxville 1, Tenn.

TEMPERATURE REGULATOR HEADQUARTERS U.S.A.

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of materials runs 20% of the total outlay in the case of a conventional finished assembly, then comparative cost of a completed titanium assembly represents a drop in the cost-spread to a factor of but 2 to 3.*

Considering all its advantages, we believe titanium can be many times less expensive than other metals. This is possible because both costly downtime and replacements can be considerably reduced.

We find that the outlook takes on a still brighter tinge when viewing the steady substantial reductions in price since the first quantity introduction of titanium five years ago. Meanwhile, the price of other metals has been increasing.

The future should bring further price drops. And as the price goes down, more applications for titanium will not only become feasible but clearly indicated.

Pipelines especially seem to offer a likely area for future applications by various food processors.

As proof of titanium's excellent performance emerges, the interest of corrosion engineers in the food industry is sure to increase. And the success of food applications will undoubtedly translate mere interest into action. —*End*

* That is, per $100 outlay for conventional equipment, $20 (20%) is for materials and $80 for other expense, total $100. Whereas with titanium, 9 times $20 gives $180 for material, plus $80 for other expense is $260.

Faster Insect-Egg Spotting—*The Enzyme Way*

New filtration method for tomato products also is simpler, more accurate. Pectic enzyme thins out count-obscuring fibers

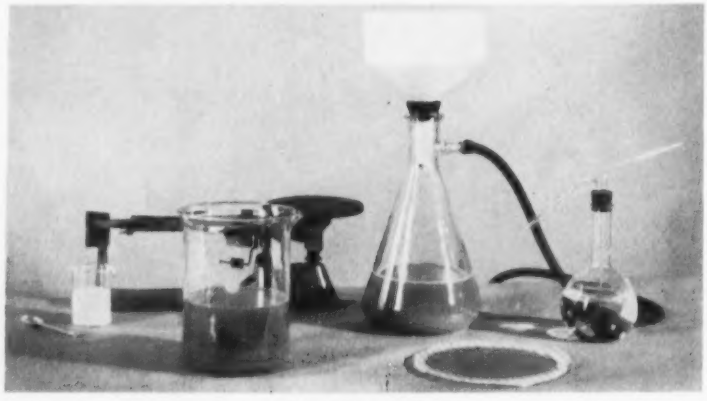
L. V. STRASBURGER and B. SANDROCK
Strasburger & Siegel, Inc., Baltimore

NOW TAKING the plod out of checking for fly eggs and larvae in tomato products—such as juice, puree, paste, catsup, and pizza sauce —is a new filter-extraction technique that features use of a pectic enzyme as a key reagent.

Furthermore, the method is highly accurate. Yet it does not require the elaborate equipment of the A.O.A.C. procedure.

The enzyme, by depectinizing the tomato fiber in a diluted sample, permits rapid filtration through bolting cloth. Thus, all eggs and larvae remain on the filter for simple microscopic identification and counting. They're not affected in any manner by the enzyme.

In contrast, all former extraction methods have depended upon settling the contaminants in separatory funnels, flasks, or jars, while the tomato fiber was floated off. Even under the best conditions, however, there often was some loss of eggs and small larvae. And recovered particles frequently were obscured by tomato fiber.



HERE'S ALL the equipment you need to speed your micro-checks. Six-step routine: (1) Weigh sample on balance (left background), (2) dilute it into large beaker (center), (3) add enzyme from small beaker (left), (4) lay ruled cloth filter (foreground) in Buchner filter apparatus (center), (5) filter diluted sample with vacuum, and (6) wash residual material through filter, using wash bottle (right). Filter is then viewed under microscope to make count on sample.

How It's Done

The 10XX silk bolting cloth employed is ruled with indelible ink so that lines are $\frac{1}{32}$ in. apart. This is slightly less than the width of the miscroscopic field at 15-dia. magnification.

The cloth is cut into 9-in.-dia. circles and placed in boiling water for uniform shrinkage. They then fit into a 6-in. Buchner funnel. Under suction, the wetted cloth extends up along the sides of the funnel to prevent any loss during filtration.

To speed filtration, a 20-mesh wire gauze circle is placed between the silk filter cloth and the funnel holes.

Also employed are plate glass or Plexiglas circles of $7\frac{1}{2}$-in. dia. After filtration, the wet filter cloth is spread evenly over the disk. The disks then permit readymoving of the cloth under the microscope.

Now to the routine of the procedure:

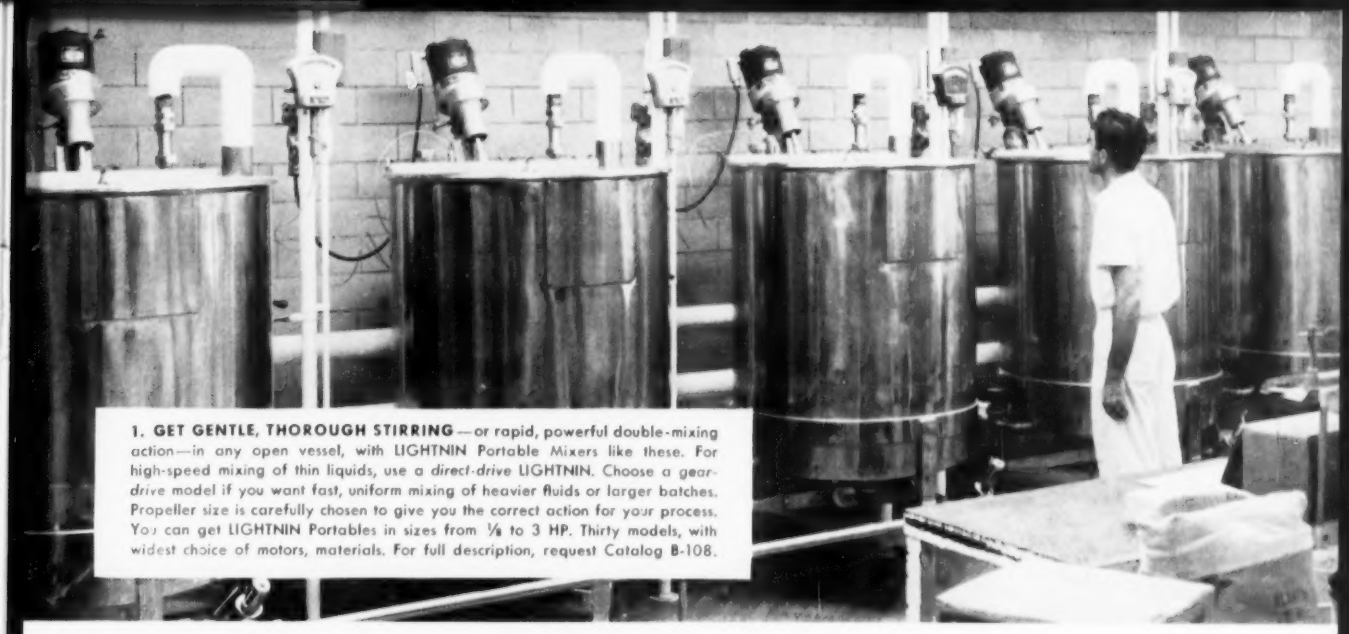
First transfer well-mixed sample (100g. of juice, puree, catsup, or pizza sauce; or 50g. of paste) to a 2-l. beaker with 200 ml. of warm water.

Add 1 level teaspoonful of enzyme (Pectinol M, Rohm & Haas Co., Philadelphia) and mix well. For paste use 2 teaspoons of enzyme.

Dilute the juice, puree, or pizza sauce to 1,000 ml. with warm water (55-60C.), and stir. Dilute catsup or paste to 1,500 ml.

Now filter with strong suction. Keep solids from forming dense layer on cloth by steady addition of sample. If necessary, hot water may be added intermittently.

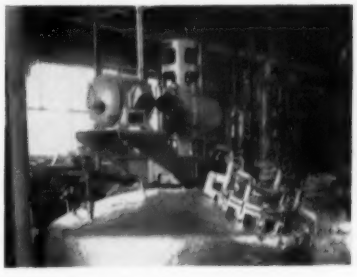
Finally wash down with 200-300 ml. of warm water and examine.



1. GET GENTLE, THOROUGH STIRRING—or rapid, powerful double-mixing action—in any open vessel, with LIGHTNIN Portable Mixers like these. For high-speed mixing of thin liquids, use a *direct-drive* LIGHTNIN. Choose a *gear-drive* model if you want fast, uniform mixing of heavier fluids or larger batches. Propeller size is carefully chosen to give you the correct action for your process. You can get LIGHTNIN Portables in sizes from ⅛ to 3 HP. Thirty models, with widest choice of motors, materials. For full description, request Catalog B-108.

5 ways to get the right **fluid mixing** *for your product*

2. FOR PERMANENT INSTALLATION, you may prefer fixed-mounting propeller mixers like these LIGHTNINs. Covered kettles, open tanks, closed pressure vessels—there's practically no limit on tank shape in which you can mix fluids with these units. Easily installed in your present tanks, or fitted to new tanks. Direct-drive and gear-drive models; sizes from ¼ to 3 HP. Fully described in Catalog B-103.



3. EVEN IN BIGGEST BATCHES, you can get precise control of heat transfer and product uniformity with a turbine-type LIGHTNIN Mixer. Turbine size and speed are scientifically selected to give just-right balance of fluid flow and turbulence. You can get these LIGHTNINs for open or closed tanks, top or bottom entering, in sizes from 1 to 500 HP. For details, request Catalog B-102.

4. FOR VERY LARGE HOLDING TANKS where you want to keep a liquid from stratifying, or blend two or more liquids to uniformity, install a LIGHTNIN Side Entering Mixer. It fits new or old tank; comes with choice of stuffing box or rotary mechanical seal that's quickly replaceable if it ever wears out. Gear-drive and V-belt-drive models; sizes 1 to 25 HP. Described in Catalog B-104.

5. FOR LABORATORY MIXING and even small production batches, you can get as much as 20 years' service from a LIGHTNIN Laboratory Mixer. You can run Model F, shown, at any speed up to 1600 RPM. Four other models to choose from, including one with UL-approved explosion-proof motor for mixing solvents and other volatiles. For description of all five, send for Bulletin B-112.

How to take advantage of what's new in mixing

There are many ways you can use modern fluid mixing to help product quality; increase yield; get better uniformity; speed production.

It takes a *specialist* to give you full advantage of today's highly developed mixing skills. Your LIGHTNIN Mixer representative can give you this kind of help, because he's backed by *35 years of specialization* in fluid mixing.

For quick, competent advice on any fluid mixing problem, call him today—or write us direct.

Lightnin® Mixers

MIXCO fluid mixing specialists

MIXING EQUIPMENT CO., Inc.
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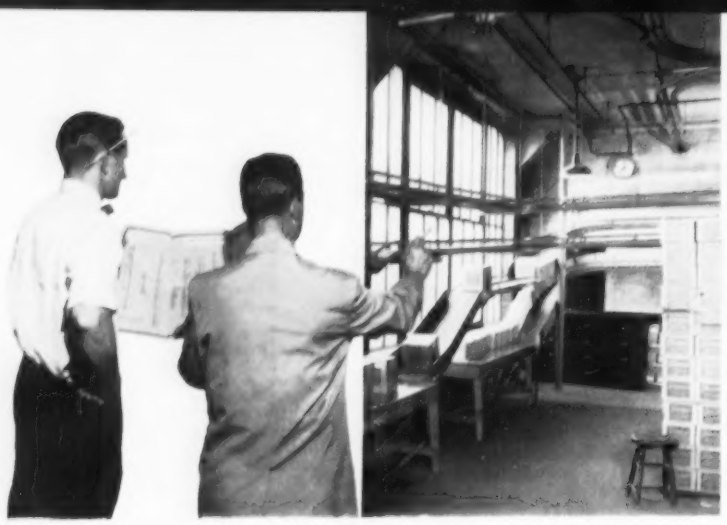
In Canada: Greey Mixing Equipment, Ltd.
100 Miranda Ave., Toronto 10, Ont.



UNFOLD HERE

Handy ruler-and-pencil computing 'graph helps you plan best production performance . . . control belts for top efficiency . . . design new conveying systems

This foldout chart speedily answers your

Processing-Conveyor Problems

RAYMOND R. HAUGH
Chief Applications Engineer, Quartermaster Food & Container Institute, Chicago

CHANGES on processing-conveying belts in your plant will, of course, have a prime effect on your production-line efficiency.

Therefore, it's vital that you take into account all variables when modifying presently installed systems, or designing new ones.

This led to our drafting of a quick and easy-to-use processing conveyor belt computer—presented in the accompanying foldout.

It can be simply and effectively employed to:—

1. **Plan future production schedules.**
2. **Help operator of conveying system to control or adjust belts for maximum efficiency.**
3. **Enable the plant engineer to determine, quickly and accurately, the variables that enter into the design of a new conveying system.**

Our nomograph comprises 15 logarithmic scales (A to O). Its operation involves seven overlapping steps—each comprising three variables, two known and one unknown.

The first two steps cover production-conveyor equipment data, such as length, width, and speed of the belt.

Dealt with in the next four steps is thickness of product on the belt and such other variables as weight per cu. ft., specific heat, and temperature rise.

Then the final Step 7 shows relationship between total Btu's added to product, lb. of 100 psi steam required to produce this heat, and boiler horsepower required at 212F.

Chief advantage of the chart—as in our food thermal computers for heating and cooling (FE Oct., p. 47, and Jan., p. 134)—is that a plant manager can see at a glance the effect each factor has on the others. And he can shift variables with no time-consuming calculations.

A limited number of reprints of this special chart are available at a price of 50¢ each.

Step-Wise Procedure Detailed

Here's the seven-step technique—illustrated on our chart by dotted-line examples—for applying this computer:

Step 1: Starting at left on chart, draw a line through usable length of belt in ft. (50 on Scale A) and width of conveyor (4 ft. on Scale B). Total usable sq. ft. of conveyor is point of intersection with Scale C (200).

Step 2: Join Scale C to Scale D (time product is on belt) with a similar line. The reading is 30 min. Next, extend the line to Scale E (usable area in sq. ft. per hr.). This reading is 400.

Step 3: Place straight-edge to connect Scale E and Scale F (thickness of product on belt), our example being 3 in. Then cu. ft. of product handled per hr. is revealed (on Scale G) as 100.

Step 4: Link Scale G through Scale H (weight of 1 cu. ft. of product, 40 lb.) to Scale I, where lb. handled hourly is found to be 4,000.

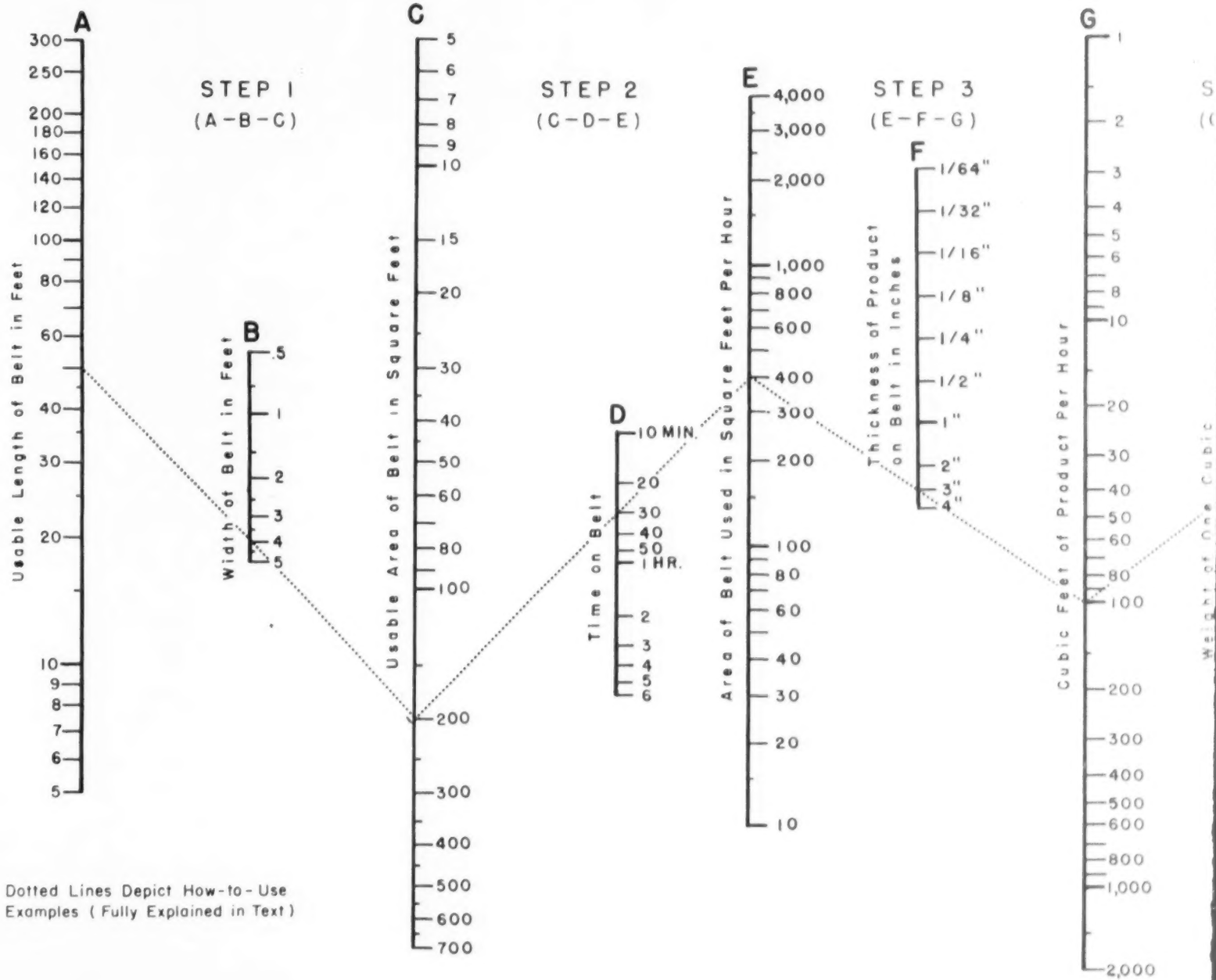
Step 5: A line run from Scale I to Scale J (specific heat of material, 0.5) is now extended to give Btu.'s required per deg. F. per weight (lb.) per hr. (2,000 on Scale K).

Step 6: Next, hook Scale K to Scale L (temperature rise in product, 50F.) to get total Btu.'s required per hr. (100,000 on Scale M).

Step 7: Draw line through Scale M to Scale N (efficiency of system, 50%) and get lb. of 100-psi. steam required on Scale O (225). Opposite this value (on Scale O') will be found the number of boiler horsepower (6) required at 212F.

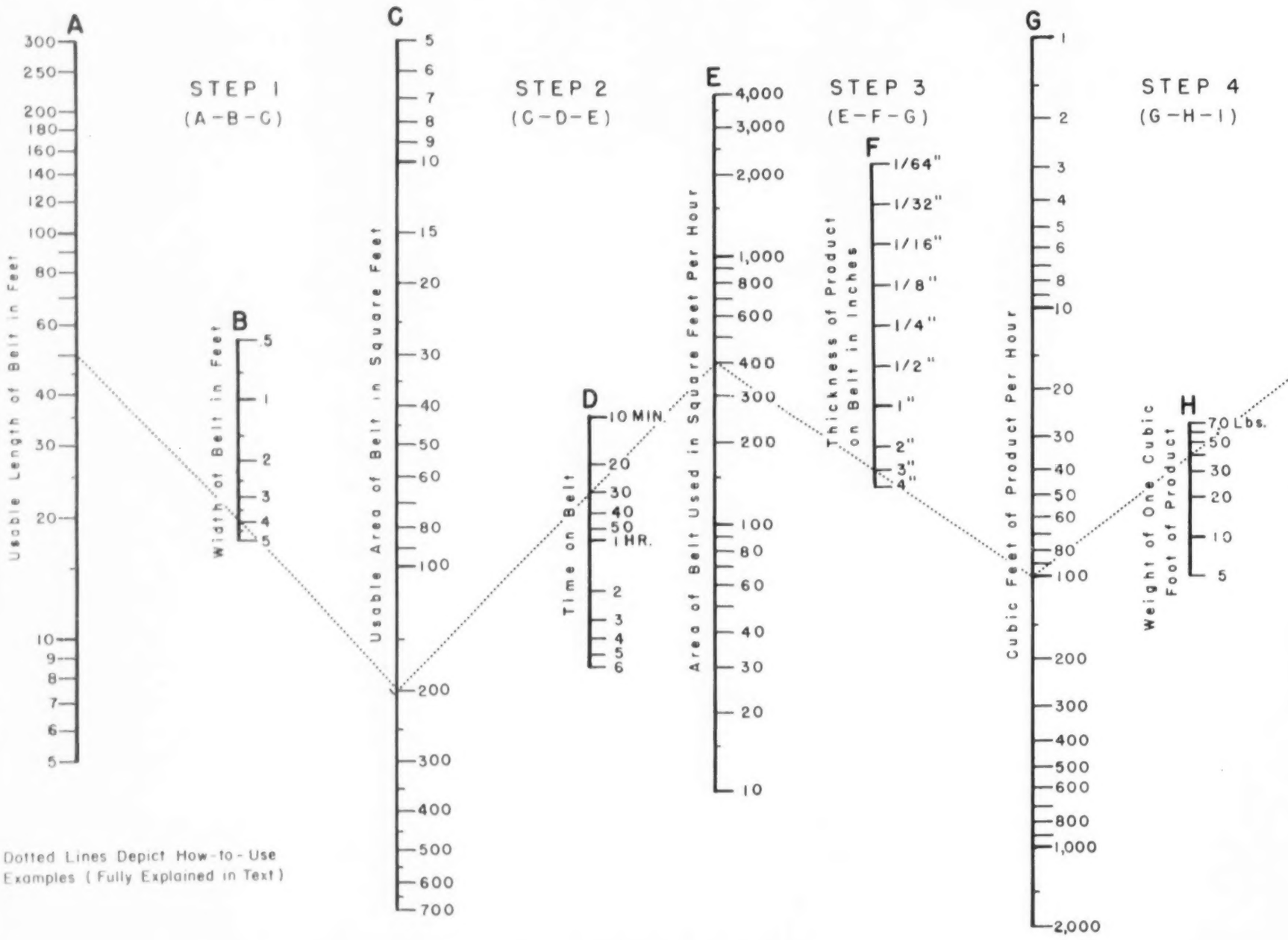
If efficiency of unit is sought, you work backward. Here, the lb. of 100-psi. steam used per hr., or boiler horsepower at 212F. must be known. Marking this point on Scale O, draw line back to total heat required by the product on Scale M. Efficiency is where this line intersects Scale N.

COMPUTER FOR QUICK PROC



Dotted Lines Depict How-to-Use Examples (Fully Explained in Text)

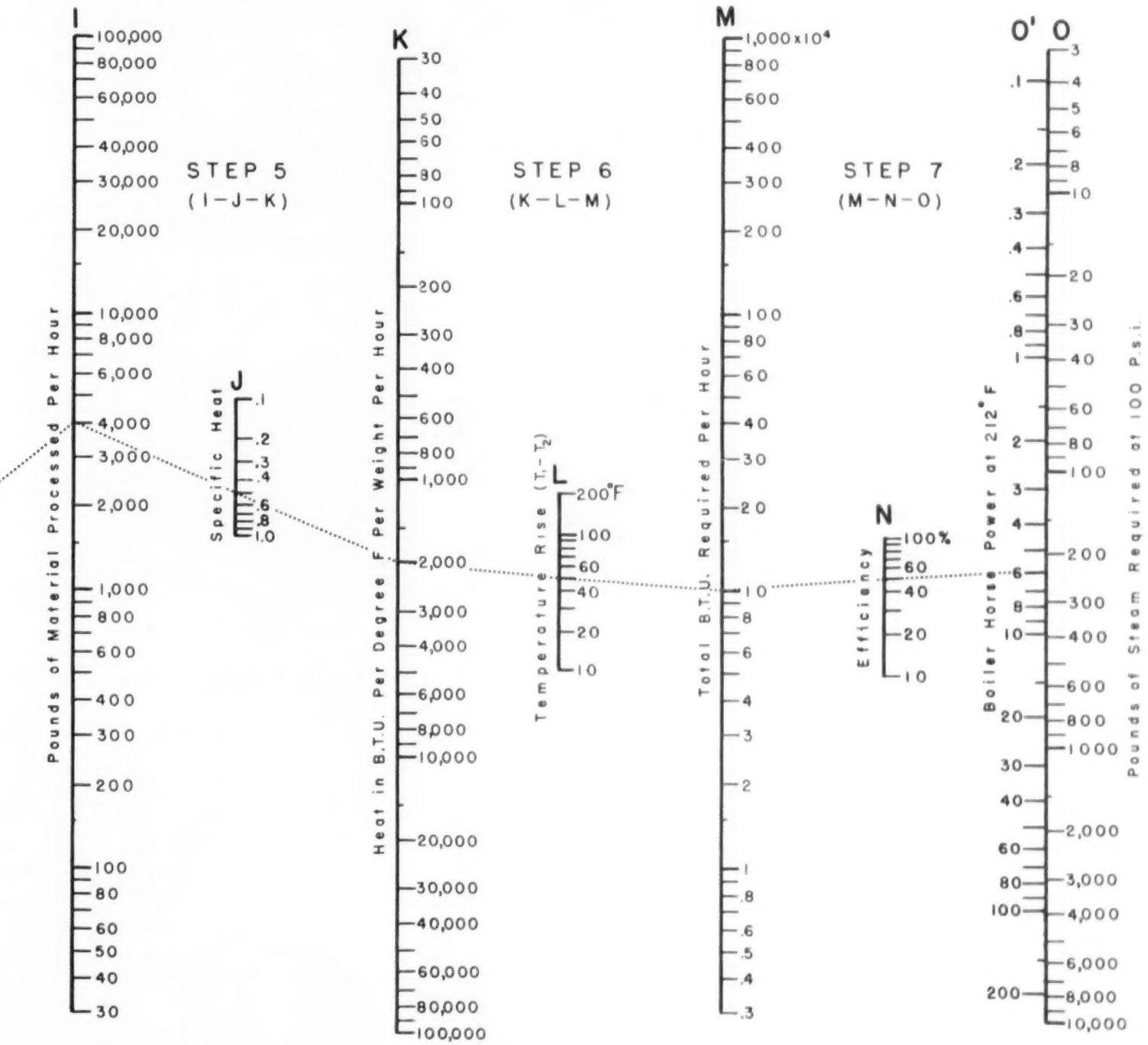
COMPUTER FOR QUICK PROCESSING-CO



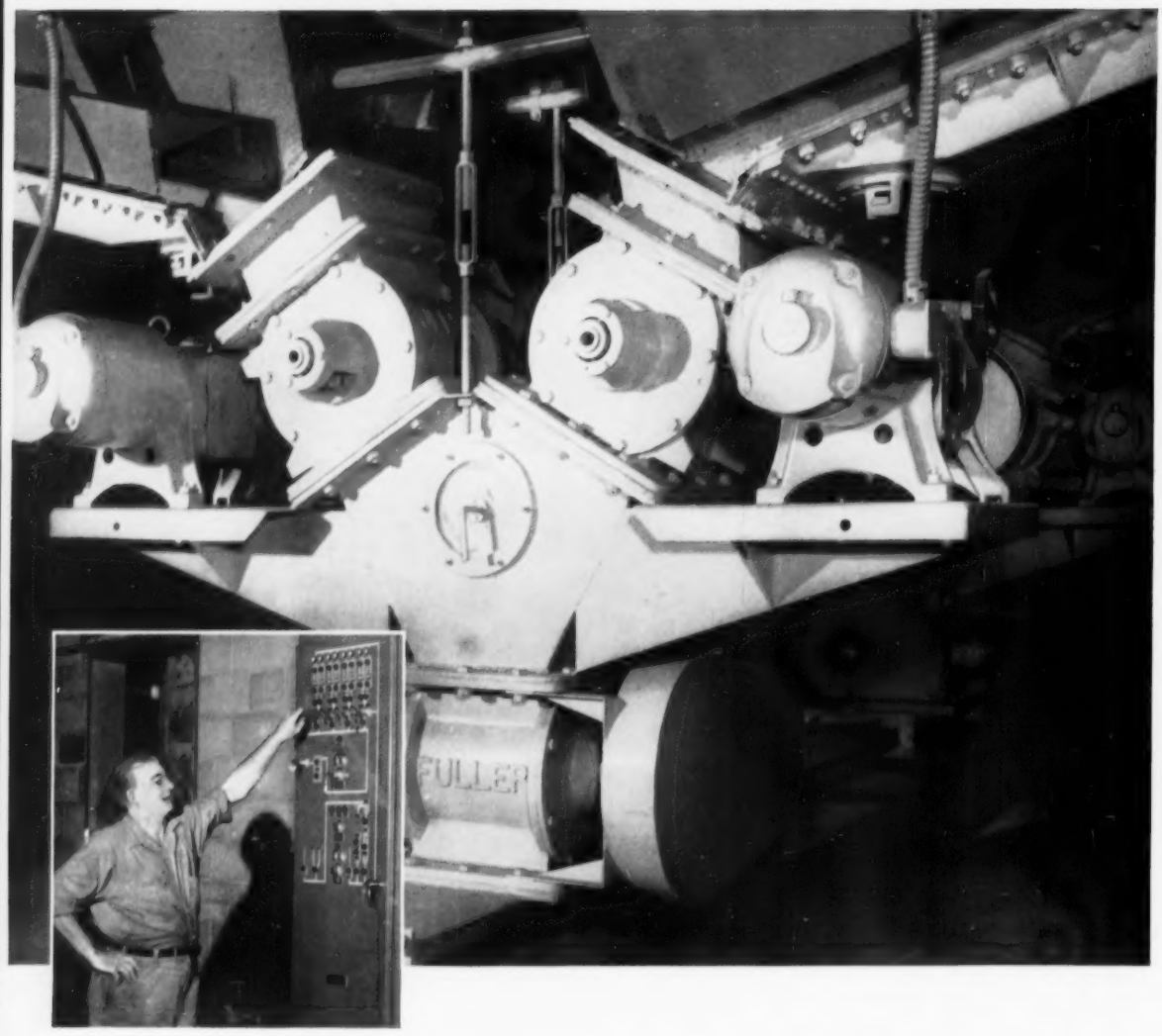
Dotted Lines Depict How-to-Use Examples (Fully Explained in Text)

Food Engineering, August, 1957

-CONVEYOR CALCULATIONS



Copyright 1957 by R.R.Hough



AGAIN . . . WARD BAKING INSTALLS THE AIRVEYOR®

Based on previous highly successful and economical performance of the Airveyor®, Ward Baking installed a Fuller pneumatic bulk conveying system in its Cleveland, Ohio plant for unloading flour from Airslide® bulk flour cars to sifters, transporting the sifted flour to storage bins, and from storage to use bins.

In this Ward plant, buying and handling in bulk results in a saving of at least 10 cents on every 100 pounds of flour. As a result of this cost-saving operation, Ward plans to install additional bulk pneumatic conveying systems in other plants in its large chain of bakeries.

Above illustration shows F-H Airslides installed in the bottom of a pair of storage bins, delivering flour to Fuller variable speed blending feeders; Fuller rotary air lock feeding blended flour to the Airveyor pressure reclaiming line to use bin. Photo left, control panel for one-man operation of the Airveyor system.

The Airveyor is adaptable to a wide variety of physical requirements. You are assured of no loss of material handled and, in addition, because of few movable parts, maintenance costs are kept to a minimum. A central control panel, operated by one man, can handle hundreds of tons of flour a day.

If you have a flour handling problem in your plant, it will pay you to get the Fuller story on how to move it cheaper and easier by air.

A-248
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FULLER COMPANY
GENERAL AMERICAN
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Fuller
pioneers in harnessing AIR

FULLER COMPANY
114 Bridge St., Catasauqua, Pa.
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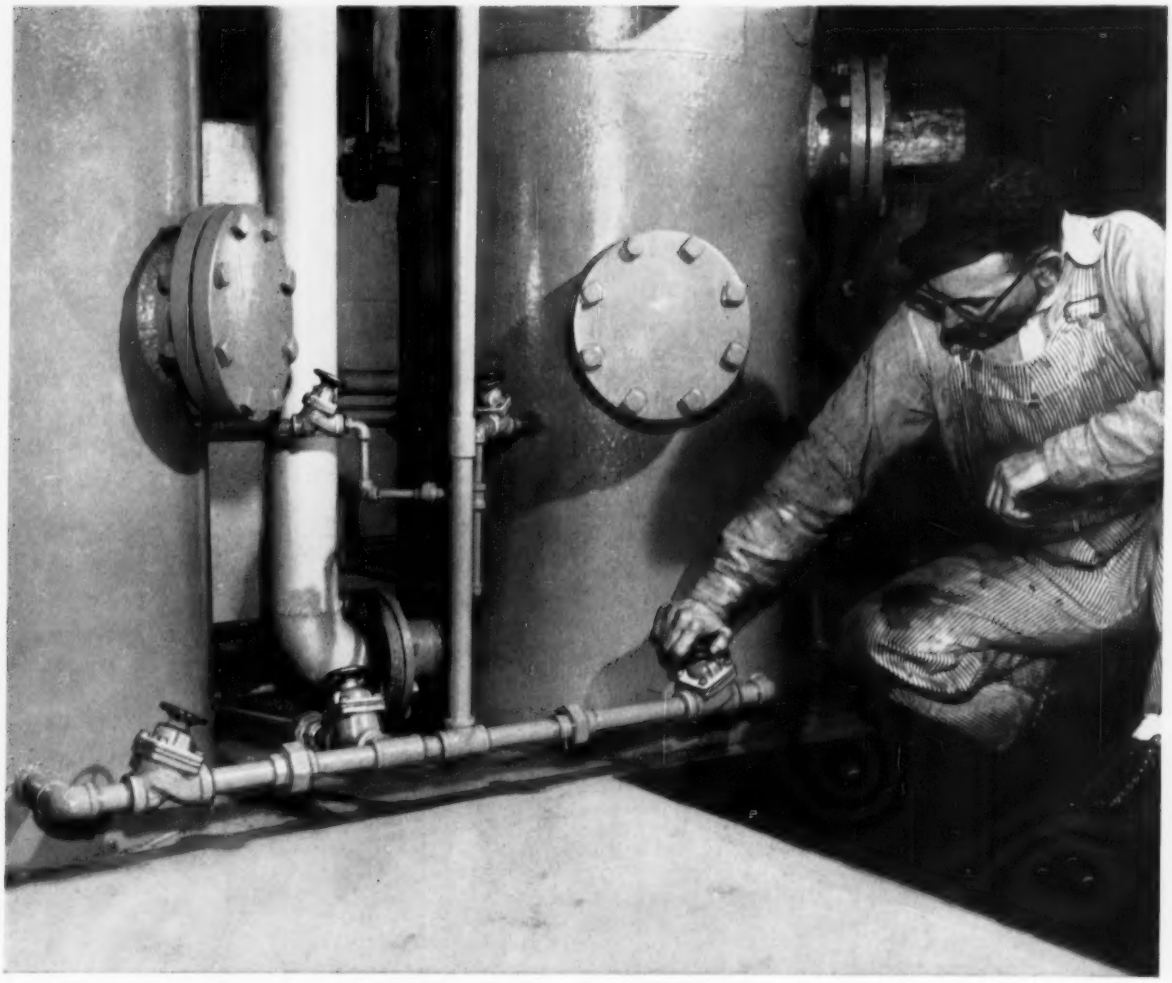
How Liquid Carbonic stopped potassium permanganate leakage



700% longer service with these Crane valves . . . still going

This case history could save money in your own operation.

Liquid Carbonic Corporation, Seattle, Wash., is using these Crane packless diaphragm valves to handle potassium permanganate in lines to scrubbers. Before installing Crane No. 1610 ½″ and 1″ valves, this dry ice plant had to replace valves of another make at least every 6 months. Constantly recurring leakage around stems called for frequent stuffing box maintenance and hindered operations.

Since changing to Crane packless diaphragm valves, there has been no leakage, no trouble of any kind in 3½ years. Valve service is already 700% better. Here's why: Crane packless diaphragm valves completely eliminate the need for stem packing and the problems of stuffing box leakage and maintenance. The diaphragm seals the bonnet from line fluids.

Make sure your valves have correct design, better materials, precision assembly, thorough testing . . . insist on Crane, from the world's largest, most complete line of valves and fittings for industry.

ASK your Crane Representative for Crane Folder AD-1942 on packless diaphragm valves, or write Crane Co., address below.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

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If you make any of these...

See how you can profit from Quaker's processing experience and facilities!

Whatever your product's specifications, give them to Quaker. We can meet a wide variety of specifications and we may save you time and money as well.

Here's how! Quaker, through its tremendous resources, offers a wide variety of grains. You can have any size granulation—from original grain to microscopic size. And these products have almost *unlimited* application in food processing. For example. Quaker's oats, corn, barley and rice are extremely neutral. Used as thickeners or carriers they may assume, accent or eliminate certain characteristics of other ingredients.

Quaker's continual quality control assures uniform high quality products. This eliminates costly and time consuming rejects. And Quaker can often offer freight savings by combining orders in mixed car shipments. Its mills, located throughout the country, assure you of quick service and more favorable freight rates. And Quaker is equipped to handle bulk, too—another saving for you.

Chances are there's a Quaker product or processing development that can help make *your* product better or at a lower cost. Contact the Industrial Sales Department, The Quaker Oats Company, Merchandise Mart, Chicago 54, Illinois.

QUAKER

THE QUAKER OATS COMPANY
CHICAGO 54, ILLINOIS

Is Industry Creating A New Breed of "Bonus Babies"?

THE STARTING SALARIES offered to this year's June graduates give the impression that industry is creating a new breed of "bonus babies." This is the term baseball fans apply to sturdy youngsters whose talent for hitting and throwing gets them payments of up to $100,000 and other benefits for signing a contract.

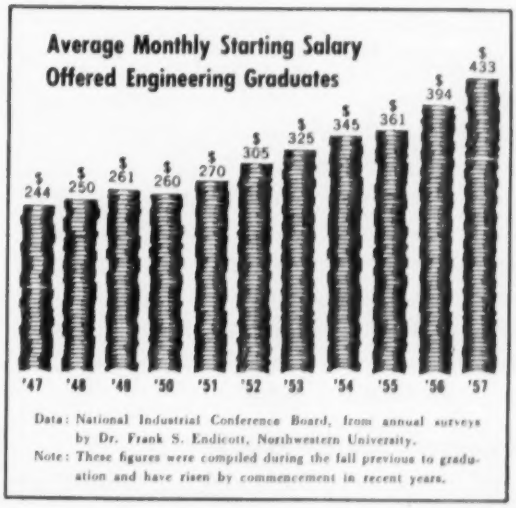
For several years industry's demand for young college graduates, especially in science and engineering, has outrun the number receiving degrees. Competition for these young people has steadily pushed up the starting salaries and has induced many companies to indulge in lavish recruiting programs. This year engineering graduates are being offered well over $400 a month, and even liberal arts graduates find numerous offers at $400 or more. Only ten years ago the salaries offered senior engineering students averaged less than $250 a month.

But any employer who assumes that high starting salaries alone will assure him the number of June graduates he wants is likely to be disappointed. A recent study by the McGraw-Hill Classified Advertising Division shows that most young engineers and scientists going into industry are more interested in their opportunities and in a company's future than they are in the size of their first paycheck.

Money Isn't Everything

In the McGraw-Hill survey, 2,596 recently-hired engineers and scientists employed in 57 companies listed the factors they had considered before accepting a position. The replies of the younger engineers and scientists—those with less than five years' experience — have great significance for employers who want to make any impression in the highly competitive market for college graduates.

- **Potential growth of the company** was listed by more young engineers and scientists than any of the 42 other items on the list as a factor that influenced greatly their decision in accepting a position.
- **Challenging opportunity** was second.
- **The company's prestige and reputation** ranked third.



Data: National Industrial Conference Board, from annual surveys by Dr. Frank S. Endicott, Northwestern University.
Note: These figures were compiled during the fall previous to graduation and have risen by commencement in recent years.

● **Progressive research and development program** was fourth.

● **Starting salary** ranked only **seventh.**

Job and Future Most Important

As a group, the factors relating to the nature of the job, its future and the company's future had by far the greatest influence in attracting young engineers and scientists to their present positions. These include three of the top four attractions—potential growth of the company, a challenging opportunity and a progressive research and development program. Other factors in this group are the company's facilities, quick advancement, self-direction or little supervision, chance to work in a certain field, small size of company and rewards for individual accomplishment.

The second most important group of attractions had to do with prestige. These include the company's prestige and reputation, executive or professional standing and association with leading men in the field. **Third in importance were financial considerations** — starting salary, regular salary increases, financing of relocation, paid vacations and holidays.

A less important group of factors influencing young scientists and engineers were essentially social. Geographic location and educational facilities in vicinity ranked fairly high. But recreational facilities, suburban or country living, pleasant housing and cultural considerations had little appeal.

Ranking lowest, by a good margin, were factors having to do with security—permanent position; health, life and surgical insurance; retirement or pension plan; and sick leave.

It is interesting to note that some of the factors which influenced the **smallest** percentage of young engineers and scientists were country club memberships, use of company car, at-cost or low-cost eating place, travel opportunities abroad and being able to buy the company's products at a discount.

A Lesson For Employers

The lesson of this survey to employers who hope to recruit more young engineers and scientists is clear. High salaries and other financial appeals are important. But, **at a time when high starting salaries are offered in abundance, our young graduates are interested even more in being with companies that will grow and in jobs that will permit them to grow. They are interested in jobs that offer opportunities for advancement, financially and professionally.**

* * *

Were the young scientists and engineers who participated in the survey trying to impress somebody with their motives? If so, it could only have been to impress themselves, for all were asked to return their questionnaires unsigned.

What Factors Influence the Job Selections of Young Engineers and Scientists?

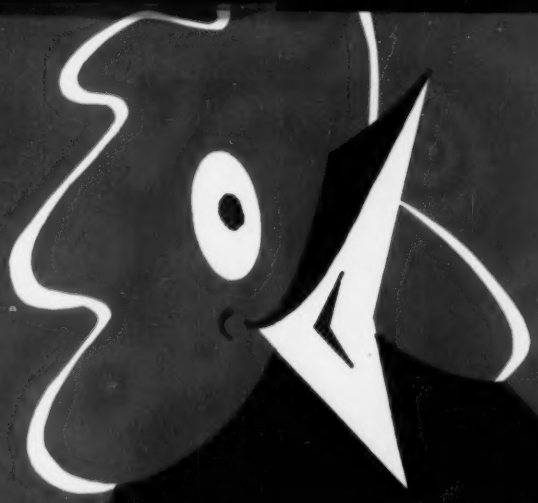
Factors Influencing Decision Greatly	Percent Listing Factor
Potential growth of company	55%
Challenging opportunity	53
Company's prestige, reputation	44
Progressive research and development program	41
Geographic location	37
Permanent position	35
Starting salary	34
Educational facilities in vicinity	33
Regular salary increases	31
Chance to work on specific project, or in certain field	27
Company's facilities (laboratories, technical libraries, etc.)	25
Tuition for graduate study	25

Based on replies by recently-hired engineers and scientists with less than five years' experience to questionnaire distributed by McGraw-Hill Classified Advertising Division.

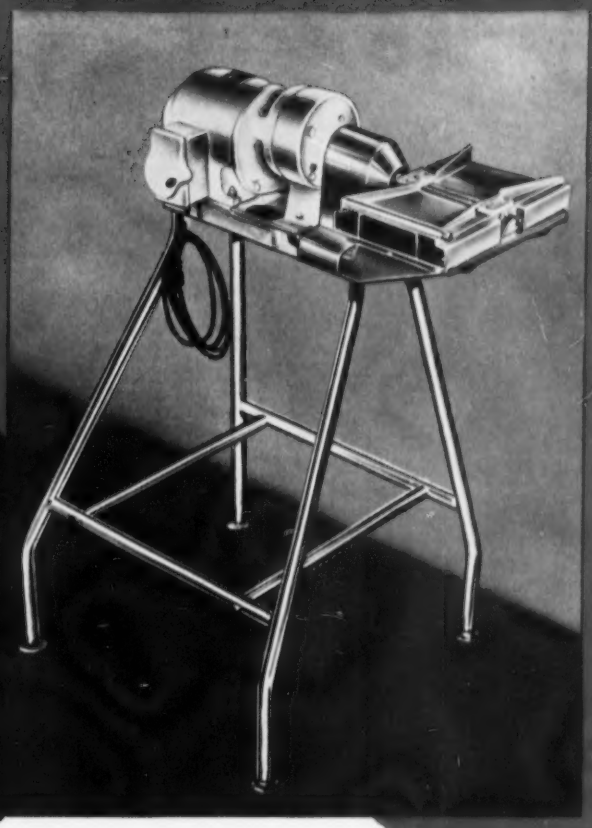
This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw
PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.



THERE'S MORE THAN ONE WAY TO SKIN A GIZZARD!



Power Gizzard Skinner Means Better Production for packers! Driven by a Master ¼ H.P. Double Parallel Gearmotor, output speed 230 R.P.M.

ANOTHER DRIVE REQUIREMENT MEETS ITS MASTER

"But my drive problems are different," you say, and right you undoubtedly are. Far as we know, this Master-powered Gizzard Skinner is unique.

But here's the point. America's productive genius consists of the ability to analyze a problem, devise a system and apply power to it in such a way as to produce better results faster at less cost. And *that problem* we bet you've got!

Let us help! Tell us the problem. From the drives listed here—or a combination of the required ones in one compact efficient unit—we'll deliver the goods! That's just what we've done for many, many years, to an ever-enlarging cross-section of American industry jealous of the performance of their motor equipment.

Motor Ratings—⅛ to 400 H.P. All phases, voltages and frequencies.

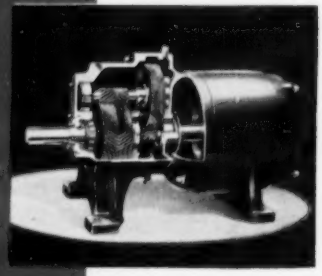
Motor Types—Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.

Construction—Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose.

Speeds—Single-speed, multi-speed, and variable speed.

Installation—Horizontal and vertical, with or without flanges and other features.

Power Drive Features—Electric brakes (2 types)—5 types of gear reduction up to 432 to 1 ratio. Mechanical and electronic variable speed units—fluid drives—every type of mounting.



MASTER

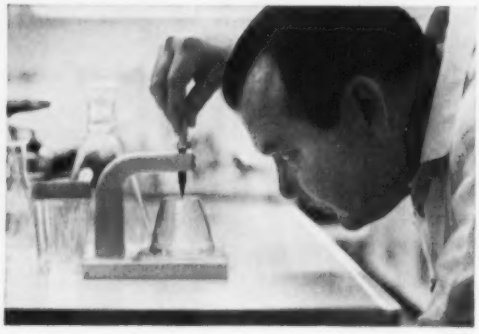
THE ELECTRIC COMPANY

Dayton 1, Ohio

One look at the huge, sprawling buildings at one of the Exchange Products plants and you know that big things are happening inside. For here *citrus* is king. Trucks pour in with fresh fruit from groves all over California and Arizona. Conveyer belts hum along in every direction. And Exchange products are shipped to nearly every part of the world.

Why 'Exchange' products serve you better

Utmost cleanliness is the watchword at Exchange Products plants. Everything has that "just washed-down" look. Every four hours, extraction equipment is completely cleaned. Every third day, the entire plant closes down for a thorough washing.



Exchange quality is assured by constant checking in extensive testing laboratories. In fact, rigid quality controls have been set up *throughout* the plant to make sure that every product measures up to Exchange quality. Sunkist produces more than 400 different citrus products.

The world's largest citrus research department is maintained by the Sunkist Growers to develop new growing methods, to improve manufacturing processes, and to perfect better products. Today, with a backlog of more than 60 years experience, Sunkist has accounted for 118 separate U.S. patents.

Just three of many Exchange products are *Exchange Preserver's Pectin*—guarantees a more uniform finished product; *Exchange Low Methoxyl Pectin*—jells *without* sugar, tasteless, controls "weeping" in pies; *Exchange Lemon Juice*—brings out natural flavor of *any* food. Superior acidulant, excellent anti-oxidant.

Sunkist Growers

PRODUCTS DEPARTMENT • ONTARIO, CALIFORNIA

Distributors for

Exchange Lemon Products Co., Corona, Calif. • Exchange Orange Products Co., Ontario, Calif.

KEEPING UP WITH THE FIELD

A-Rays Create Plant Monsters

The product being examined with awed delight by this Tar Heel youngster is a giant peanut—created by atomic radiation at North Carolina State U. The A-rays, say plant biologists, upset normal hereditary patterns, forming new plant groups that can be developed into permanent strains. Experimental cultivation of the monsters has been encouraging—boosting acreage yield 10 to 15%. The atomic peanut has a strong resistance to blight, too, a property that could save growers millions of dollars per year.

House Fight Looms On Stockyard Act As Senate Group Votes FTC Control

Tangled Congressional attempts to determine just who should be responsible for regulating trade practices of meat packers—the Federal Trade Commission or the USDA—were unraveled slightly as FE went to press by a Senate Judiciary Committee decision that gives the nod to FTC. The approved bill, introduced by Senators J. C. O'Mahoney and A. Watkins, also knocks out the present definition of a meat packer as one who owns 20% interest in a meat packing firm.

Now attention will center in the House, where a profusion of committees are holding hearings on the controversial subject of whether or not all packers should be under FTC, or only those firms—such as food chains—that are incidental meat packers under the 20% definition.

A joint hearing, started in June by the House Antitrust Subcommittee and the House Interstate Commerce Subcommittee, has reached no conclusion to date—but plans further discussion.

The House Agriculture Committee is also holding hearings and expects to report on a bill before the end of the session.

The reason for this duplication of effort in the House is that any change will affect both an anti-trust law (the Federal Trade Commission Act) and an agricultural law (the Packers and Stockyard Act). It is likely that the two House groups will sponsor conflicting bills.

Meat men, the Agriculture Department, and the Chairman of the House Agricultural Committee all favor USDA control over the packers. The most that this group will agree to is the closing of a present loophole in the Stockyard Act that permits non-packers, such as big chains, to "escape" the FTC by acquiring a 20% interest in a packing company.

Backers of the O'Mahoney bill are not ready to give up their idea of putting all packers under FTC control by merely closing the loophole.

With these opposing views, Congressmen are not willing to predict what—if any—changes will be made in the current law. And the possibility of a Senate vote on its Committee-approved bill is clouded by the present legislative battle over civil rights, which may prevent any action being taken this session.

High Protein Candy Bars?

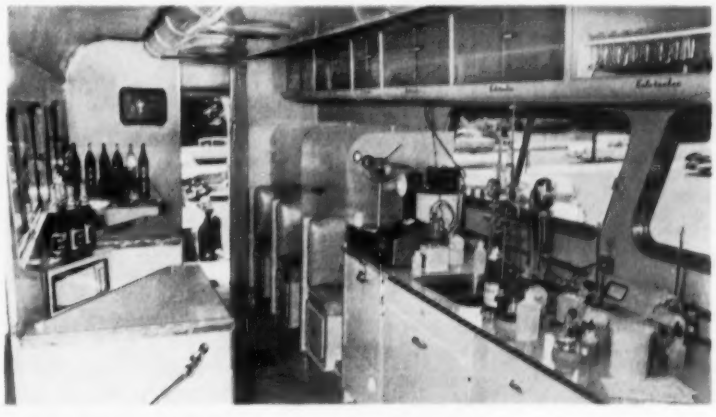
Consumer concern over fats and calories may force manufacturers to make the candy bar of the future with high-protein ingredients, declares James J. Albrecht, food engineering instructor at Illinois Institute of Technology.

Defatted soybean and peanut flours, he continues, would not only improve nutritional values in candies, but would add a pleasing crunchy texture and boost shelf life.

Alaska Firm to Pack Shrimp

Opening of Alaska's first shrimp canning operation at Wrangell is announced by Ivar Wendt, a Seattle food broker.

A shrimp picking machine, shipped from New Orleans, will enable the facility to get underway, and is expected to encourage more shrimp fishing in the Territory.



Mobile Taste and Test Lab Takes to Highways

To find out just how the quality of its bottled beverages stand up in retail stores, and what kinds of flavors its customers like—Hoffman Beverage Co., Newark, N. J., has "launched" a $50,000 mobile lab. The modern, air-conditioned unit is fully equipped with radio-telephone, running water, booths, and electrical equipment for taste and lab tests.

quality is more than skin deep...

with

VICTOR BELTING

Sure the "skin" is important... it's the surface that touches the food. But the life expectancy of the base belting itself is where quality really shows.

Realizing this, our research department conducts continuous, exacting tests on belt wear and life to make certain the components of Victor Belting are the best suited to give long service, to permit thorough removal of food residue, and to keep "belt-taste" from the food being handled. That's why—with complete confidence—we recommend for your food handling:

VICTOR SUPRENE . . . special-woven cotton duck belting thoroughly impregnated with a Neoprene compound. Waterproof, resistant to grease and most food chemicals, smooth-surfaced, and easily cleaned.

VICTOR 475 . . . highest quality, solid-woven cotton belting impregnated and coated with a Neoprene compound. Developed for use where cleanliness is a must. Washable with hot water or steam. Resists rancidity and deterioration.

For food handling the modern sanitary way select from—

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- Solid-Woven Belting • Hycar Belting
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300-6 W. Hubbard St., Chicago 10

New Food Tech Lab for N. Y. State U.

Students returning to the State University of New York, Agricultural & Technical Institute at Morrisville this fall will find a brand new food processing laboratory ready for use. The new facility is fully equipped to can and freeze fruits and vegetables, process meat, and cook jams and jellies.

Symposium to Air Packaging

Military and industrial experts will sit down to discuss joint problems in packaging and materials handling at a symposium to be held in Fort Lee, Va., Oct. 1-3.

Theme of the third annual discussion—combining Army, Dept. of Commerce, and National Security Industrial Assn. men—will be "Packaging and Materials Handling in Action". Speakers will relate packaging to materials handling conditions in the field, and thus familiarize defense and industrial men with new developments in this critical area.

FDA Gages A-Ray Fallout On Grains, Food Packages

Affect of atomic fallout on the nation's food supply has been measured by the FDA during the recent atomic bomb tests conducted at the Nevada proving ground.

Results are now being evaluated by Food & Drug officials, headed by Dr. Edwin P. Laug, physiochemistry chief. The conclusions will be submitted to the Atomic Energy Commission, and probably released for publication in the Fall.

This report will contain some—but not all—of the answers sought by FDA. The reason: FDA failed to get the additional funds from Congress needed to keep its testing team in Nevada past July 1. Thus the group returned to Washington after participating in only one of a series of tests, originally planned for the food project.

In this test, FDA did expose wheat, and oil bearing seeds (such as soybeans) to fallout. These are now being milled under various conditions to determine just how millers can turn out clean oils and flour from A-ray-contaminated raw materials.

FDA was also able to expose retail packages of processed foods, such as cereals, to fallout and will be able to report on resistance of various packaging materials to contamination—and how well they protect the contents.

The abrupt termination, however, prevented FDA from discovering whether or not regular civil defense cleanup procedures could decontaminate food packaging materials on the spot immediately after a bomb blast.

Launches Half of Wine Ship

Slipping swiftly down the ways recently, the forward half of the S. S. Angelo Petri—a new ocean-going wine transport—was quickly nosed into a nearby San Francisco drydock, there to be joined to a ship stern salvaged from an old tanker. The completed 21,800-ton vessel, owned by United Vintners, Inc., San Francisco (FE Aug. '56, p. 169), will be fitted with 26 stainless steel vats holding 2,383,540 gal. The ship will carry California wine to New York, returning with liquid products such as corn syrups, grain spirits, and edible oils.

Imprint labels
as you need them –

You can reduce your label inventory, cut printing costs, avoid overstocks and waste... by using a Tickometer to imprint labels, as they are needed.

• Imprinting labels – with weight, grade, size, color, type, code or date – is far faster and cheaper than "rubber stamping" or other marking. It's also more economical and more efficient than conventional label imprinting. You do not run into problems of inventory and storage caused by the oversupply or shortage of preprinted labels bearing various information.

• The Tickometer imprints up to 1,000 pieces *a minute*, has a printing area 2 3/16 by 7/8 inches, gives close register, and takes almost any kind or weight of paper, in sizes from 1 by 2 inches up to 15 by 15 (according to the Tickometer model). Feeds and stacks automatically, does not require a skilled operator. And can also be used to save clerical time in marking or imprinting checks, cards, coupons, tickets, sales and production slips, parts envelopes, tags, etc.

• It's so accurate, banks use it to count currency! It can be set for a predetermined count, and for registering part totals as well as whole. And it even provides for optional consecutive numbering!

• Hundreds of manufacturers have found the Tickometer a big economy. Rented or sold. Nationwide service from 302 cities. Ask the nearest Pitney-Bowes office for a demonstration. Or send the coupon for a free booklet and case studies of savings.

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TICKOMETER

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the general utility STAINLESS STEEL

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This straight chromium stainless grade possesses desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that are also of value in many civilian applications. More than 50% of all stainless applications could satisfactorily employ 430 stainless as an economical and practical material. Type 430 stainless costs 10¾ cents per pound less than the 18-8 grade. Some of our customers are already saving more than $215 per ton using our MicroRold 430 stainless sheet. Why not investigate the possibilities of this general utility 430 stainless.

Send today for your copy of our 24-page booklet, "MicroRold 430 Stainless Steel Handbook."

MicroRold 430 sheets are available up to 48″ wide as thin as .010″, and up to 36″ wide as thin as .005″ in commercial finishes and tempers.

Washington Steel Corporation
8-W Woodland Avenue, Washington, Pa.

Tests Thaw Gage for Frozens

Latest attempt to make an indicator that will show when frozen foods have been subjected to quality-destroying thaw temperatures is a polyethylene enclosed tube of chemicals called Freez-Chex, made by Aseptic-Thermo Indicator Co., North Hollywood, Calif. The device, intended for inclusion in frozen food shipping cases, is now available to interested processors for actual field checks.

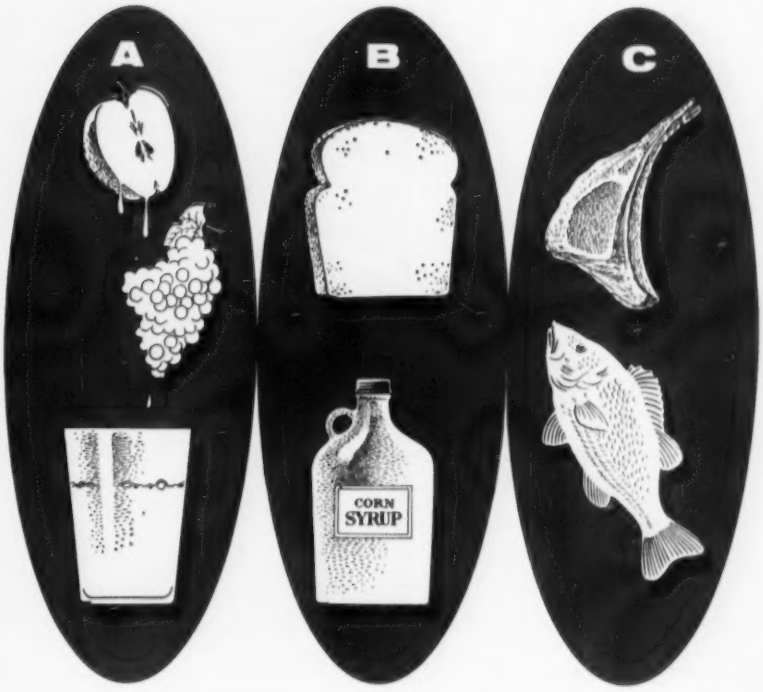
Irradiated Foods By 1960, States New Federal Report

Commercial production of irradiated foods may be a reality by 1960, according to a report just released by the Interdepartmental Committee, a government group composed of representatives from the Departments of the Army, State, Interior, Agriculture, Commerce, Health Education and Welfare, and Atomic Energy Commission.

A preliminary study of 80 selected foods was completed by QMC in 1956, the report continues, that will be used to guide operation of a nuclear pilot plant, now under construction at Lathrop, Calif.

During 1957, research has been narrowed to develop specific information on certain foods. Industry participation on research and development has started. And more than 70 industrial firms and educational institutions are now involved in the program.

Taste, packaging, and storage studies will continue in '58, with pilot plant research pinpointed on 20 promising foods in '59. By 1960, states the Committee, the Army proposes to conduct large-scale troop acceptance tests for irradiated products. And trial procurement of a few selected items will be solicited from industry.



NATURAL ENZYMES
for food processing

Rohm & Haas commercial enzymes are all natural products . . . and among the most effective aids in food processing.

They are easy to use and are well suited to the mild processing conditions common to the food industry. In service they provide many benefits. For example, they clarify fruit juices, tenderize meats, aid in the production of pre-cooked breakfast cereals, improve the texture of bread, and reduce the viscosity of chocolate sirups.

Rohm & Haas enzymes catalyze specific reactions; unwanted by-products are not formed. And little enzyme goes a long way toward increased production efficiency and greater consumer sales appeal.

Write to Department SP outlining your food processing problem.

A **PECTINASE:** fruit juices, concentrates, wines

B **DIASTASE:** bread, cereal-derived products, corn sirup

C **PROTEASE:** meat, fish, beer

Chemicals for Industry

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

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New... Improved

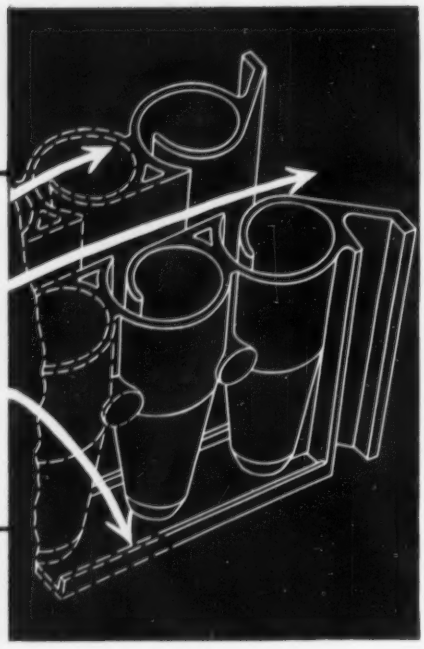
MICROCLONE
DUST COLLECTOR

NEW *casting process* provides smoother interior finish — "Cling-Free" surface.

NEW *inlet design* assures better distribution of air and material.

NEW *flange design* eliminates all protrusions in dust hopper — meets strictest sanitation requirements.

NEW *seal surface design* assures air-tight operation for highest efficiency.



THESE MAJOR DESIGN IMPROVEMENTS on the widely used and highly regarded "Microclone" M-40-A Dust Collector mean... *higher returns on your investment in food processing equipment.*

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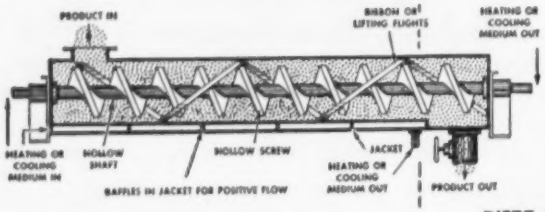
for more information and descriptive literature.

P.O. BOX 2520 **dustex CORP.** BUFFALO 25, N. Y.

This is a drawing of a **RIETZ THERMASCREW**



BUT...WHAT WILL IT DO FOR YOU?

Rietz Thermascrews may solve your problems in Continuous

HEATING **CRYSTALLIZING** **MIXING**
COOLING **SOLVENT EXTRACTION** **DRYING**
CHILLING **COOKING**

You can find out at our expense and without obligation

RIETZ FREE LABORATORY TESTING SERVICE uses your product and your specifications.

You are given test samples and a full laboratory report.

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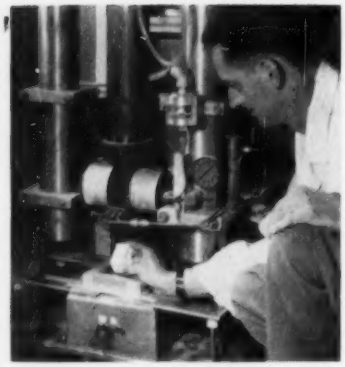
Rietz MANUFACTURING CO.
Santa Rosa, Calif. West Chester, Penn.



Sells Food Radiation Service

Targeting a dried milk sample in a 10,000,000-electron-volt linear accelerator, a Stanford Research Institute technician avails himself of a new irradiation rental service at Applied Radiation Corp., Walnut Creek, Calif. The research center, established to stimulate interest in high-energy processing, is already being used to investigate nutritional and flavor effects of various radiation doses on foods, and to study ray-preservation of onions and lemons.

Offers Compact Can Maker

A complete can and lid making installation—set up right in the processing plant, and ready to go at the "turn of a key". Such facilities are now a reality, according to the E. W. Bliss Co., a manufacturer of can making equipment that is celebrating its 100th anniversary this year.

Among the company's recent developments is a line of high speed machines that includes a strip feed press capable of turning out 600 finished can tops per minute, and a new body maker that hits a 450 per min. clip.

The compact can making installations reflect a current trend toward do-it-yourself converting among large processors.

Food Tech Courses in Fall

Bakery sanitation, food engineering, basic food technology, and confectionery technology courses are featured at two institutions this fall.

At the American Institute of Baking, Chicago, a short course in bakery sanitation (lasting six days) will cover a wide range of material such as Federal and state regulations, insect and rodent control, and ingredient storage from Nov. 4 to 9.

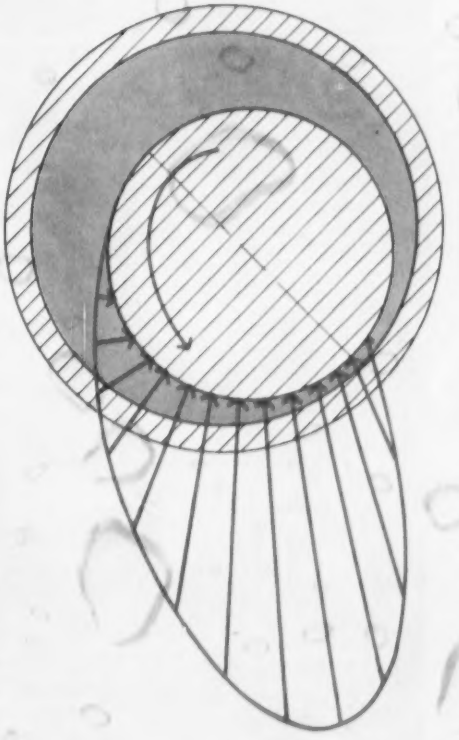
At the City College of New York, full-semester night school programs will detail basic food tech subjects such as chemistry of sugars, starches,

DO YOU USE STEAM, WATER OR ANY LIQUID IN YOUR PROCESS?

Then you may need

STANOIL Industrial Oil

Plants with wet processing have a real lubrication problem when steam, water or liquids from the processing operation enter the lubrication system. Many lubricating oils emulsify when agitated with water, especially when there is a small amount of dirt present. With water in the oil, there is the chance that no oil film exists between metal surfaces. Result: wear, corrosion, equipment failure. The chance of this happening is eliminated when you use STANOIL Industrial Oil.



By special refining techniques, STANOIL Industrial Oil is made resistant to emulsification. No matter how tight the lubrication system, some water will always be present either through seepage or through condensation. STANOIL resists the tendency of this water to mix with the oil. Instead, STANOIL separates out and continues to perform its job of lubricating bearings and other moving metal parts. In addition, STANOIL minimizes air entrapment with a special defoamer additive.

This is just one way in which STANOIL Industrial Oil can help you get superior lubrication of equipment. STANOIL has unusually high stability, gives longer oil life, minimizes carbon deposits and wear of equipment. A special rust inhibitor prevents rust and corrosion by "plating out" on metal surfaces.

STANOIL's low pour point assures a free-flowing lubricant in cold service and at start up.

STANOIL has a high viscosity index, resists viscosity change over a wide temperature range. The low carbon-forming tendency of STANOIL means low-cost operation and long-service life of equipment.

Get the facts about STANOIL Industrial Oil from the Standard Oil office near you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

Lubrication trouble spots
where STANOIL Industrial Oil can serve you

- **Washing equipment**
- **Agitators**
- **Conveyor drives**
- **Air compressors**
- **Speed reducers**
- **Lift trucks**
- **Electric motors**
- **Auxiliary turbines**

STANDARD OIL COMPANY
(Indiana)

STANDARD

Only Gas Atmospheres Delivers completely unitized and factory tested generators . . . .

Here's an important consideration when buying generator equipment. All Gas Atmospheres Generators are unitized, compactly constructed and assembled by experts on a common frame and thoroughly factory tested to specification. When they reach their destination they are ready to set into position and go to work with an absolute minimum of make ready.

This practice assures you that you get exactly what you ordered and permits Gas Atmospheres engineers to build more generator into a smaller frame. What's more, unitization greatly simplifies maintenance — reduces downtime and upkeep costs.

Why not look into the many advanced features found only in Gas Atmospheres generators when next you're in the market? Let us put you in touch with a user and we're sure your next generator will be a Gas Atmospheres.

The second of two 20,000 cfh food purity nitrogen generator systems, includes generator through purification — drying and compressing to 250 lbs. on a common base.

gas Atmospheres, inc

equipment for producing industrial gases

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341

and other food products, and fundamentals of food processing operations; and a food engineering course will cover unit processes such as drying, cooling, and humidity control. Both courses start Sept. 16.

These two courses will be followed in the spring by confectionery technology and further engineering study in mixing, fluid flow, and separation operations.

BRIEFLY

• **MERGER** of Shirriff-Horsey Corp. Ltd., Salada Tea Co. Inc., and Salada Tea Co. of Canada Ltd. (FE July, p. 130) is now complete. Shareholders will be asked to approve a new corporate name for the combination—Salada-Shirriff-Horsey Ltd.

• CERTIFICATION FEES for coal tar colors have been upped by FDA in an amendment dated July 1, 1957.

• **BEVERAGES** packed in cans have shown a sharp increase in popularity, according to American Can Co. Company officials state that first-quarter production in '57 was 61,000,000 units—up 38.6% over the same period in '56.

• POULTRY plants handling large volumes of birds can really profit through processing byproducts and waste, such as feathers and offal, insists a recent report from USDA. The report shows steps in converting the waste material into saleable fertilizer and feed products.

• **DIETICIANS** will probe problems in nutrition at the 40th annual meeting of the American Diatetic Assn. in Miami, Oct. 22-25.

• PEACH PUREE with superior flavor qualities has been produced in a new continuous process developed by USDA's Eastern Utilization and Development Div. The process is not yet in commercial use.

• **EGGS** are now given several extra weeks shelf-life with a new spray coating, devised by Safeway Stores' Brentwood Egg Co., Emeryville, Calif.

Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to the *Federal Register*.

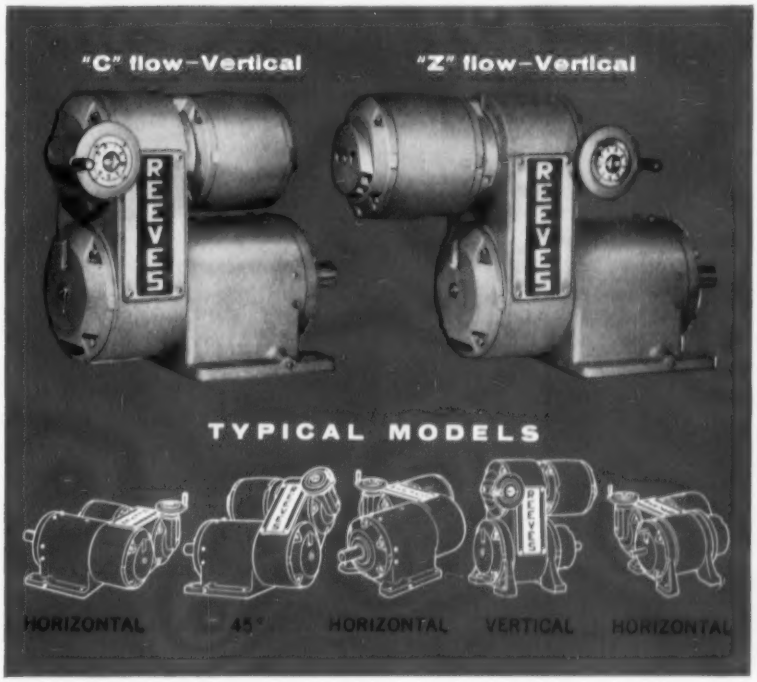
Avocados, Florida, AMS proposed *U. S. Standards*, *F.R.*, June 21, p. 4392.

Shell Eggs, AMS proposed

NEW **REEVES**®

*Sizes 200-300 Vari-Speed MOTODRIVES**

*200-300 Size, 1 through 5 hp.; full line, ¼ through 40 hp.



The flexible design of these compact new REEVES variable speed power packages permits hundreds of combinations . . . space-saving, space-fitting *standard* assemblies to meet most installation requirements. All models are available in both "C" flow and "Z" flow styles.

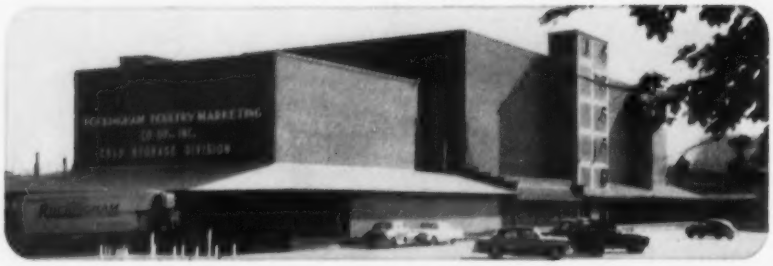
New increased capacity is built in the reducers—single, double or triple stages . . . new disc assemblies permit wider output speed ranges . . . discs are pre-aligned . . . pre-loaded spring maintains correct belt tension for longer belt wear . . . *exclusive* "close-grooving" lubrication assures free sliding discs . . . new Metermatic system automatically lubricates the motor and variable shaft bearings.

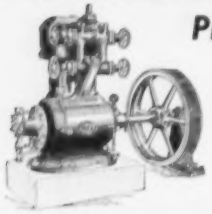
Complete information on all phases of the versatile 200-300 sizes Vari-Speed Motodrives is given in new Catalog. Write for your free copy today—Dept. FE32-M571.

REEVES PULLEY COMPANY

Division of **RELIANCE** ELECTRIC AND ENGINEERING CO.

Columbus, Indiana





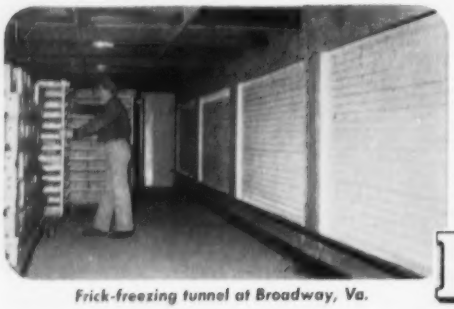
Thirteen Frick compressors serve the Rockingham Co-op.

Processing 36,000 Chickens A Day—

The Rockingham Poultry Marketing Co-op., Inc., has six buildings in its great plant near Broadway, Va.

Frick refrigeration has aided the growth of the plant for 20 years in a wide variety of ways —cooling numerous storages to different temperatures, quick-freezing poultry and other products, making 50 tons of ice daily, and doing air conditioning.

What is YOUR special cooling problem? Let Frick Engineers aid you in solving it now. Write, wire or phone

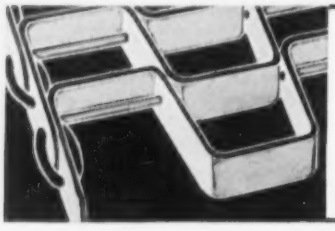


Frick-freezing tunnel at Broadway, Va.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

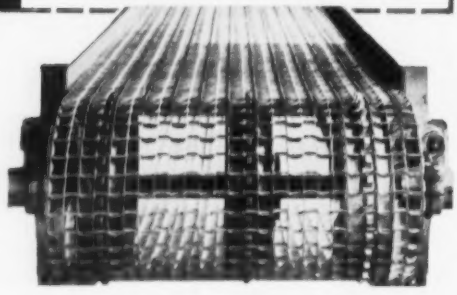
WAYNESBORO, PENNA., U. S. A.



Engineered for EVERY Process

LA PORTE

FLEXIBLE STEEL CONVEYOR BELTING



Food moves smoothly through freezing, cooking and dehydrating processes on this all-process conveyor belting that costs less, wears longer, and requires less maintenance.

The open-mesh construction assures a positive drive on the sprocket, provides for fast drainage, permits free circulations of air around products in process, prevents waste accumulation, protects your products against odors and off flavors, and makes sterilizing with a steam gun or scalding water simple and easy.

If you process, package, ship, or store food products this is the belt for you. Available in ½" x 1" also 1" x 1" in any length and practically any width.

LA PORTE

Ask your Mill Supplier or write for illustrated literature, prices.

MAT AND MFG. CO.

BOX 124 — La Porte, Indiana

amended U.S. Standards, *F.R.*, June 21, p. 4395.

Poultry, AMS proposed amended U.S. Standards, *F.R.*, June 21, p. 4395.

Sweet peppers, frozen, AMS proposed amended U. S. Standards, *F.R.*, June 28, p. 4532.

Tomatoes, fresh, AMS U.S. Standards, *F.R.*, June 28, p. 4528.

Raspberries, canned, AMS proposed revision of U.S. Standards, *F.R.*, June 29, p. 4617.

Apple butter, AMS proposed revision of U.S. Standards, *F.R.*, July 4, p. 4709.

Okra and tomatoes, canned, AMS proposed U.S. Standards, *F.R.*, July 13, p. 5541.

Prune juice, dried, FDA Standard of Identity, notice of filing time extension, *F.R.*, June 19, p. 4326.

American cheese food, grated, FDA Standards of Identity, *F.R.*, June 19, p. 4323.

Frozen concentrates for lemonade, FDA Standards of Identity, *F.R.*, June 29, p. 4620.

Orange juice, certain types, FDA Standards of Identity, *F.R.*, July 12, p. 4918.

On fat of meat from cattle, sheep, and hogs, cranberries, hazelnuts, hickory nuts, horseradish, parsnips, pecans, peppers, pimentos, rutabagas, walnuts, tolerances of Toxaphene, *F.R.*, June 29, p. 4615.

On celery, tomatoes, and potatoes, the tolerances of 2, 4-dicholoro-6-(o-chloroanilino) triazine, *F.R.*, July 12, p. 4918.

Schedule of Events

August

21-23—USDA's West. Util. Res. & Dev. Div., annual potato utilization conference; Albany, Calif.

25-28—National Fancy Food & Confection Show; Sheraton Astor Hotel, New York City.

26-28—National Soybean Processors Assn., American Soybean Assn., joint annual meeting; Leamington Hotel, Minneapolis.

28-30—Instrument Society of America, national gas chromatography conference; Kellogg Center, Michigan State U., E. Lansing.

September

8-11—National Frozen Food Distributors Assn., national merchandising convention & exposition; Hotel Sherman, Chicago.

9-13—Instrument Society of America, instrument automation conference & exhibit; Cleveland Auditorium.

15-18—Produce Packaging Assn., annual conference & exposition; Shoreham Hotel, Wash. D. C.

29-02—Packaging Machinery Mfrs. Institute, annual meeting; The Cloister, Sea Island, Ga.

A for apple is the beginning of most primers. And apple is the first choice in flavor with most Americans, who enjoy an alphabet of apple dishes. To the distinguished family of Firmenich flavors, now enhancing many food products, is added that of Apple, captured by patient research and recreated by chemical skill. It is another Firmenich achievement, already welcomed by manufacturers who have added this popular flavor to their line of products; by others to improve those already established. Highly concentrated, stable, of the utmost fidelity and purity, Imitation Apple by Firmenich is offered with pride for your profitable use. Samples and technical data on request.

A FOR APPLE / NOW CAPTURED IN IMITATION APPLE BY FIRMENICH

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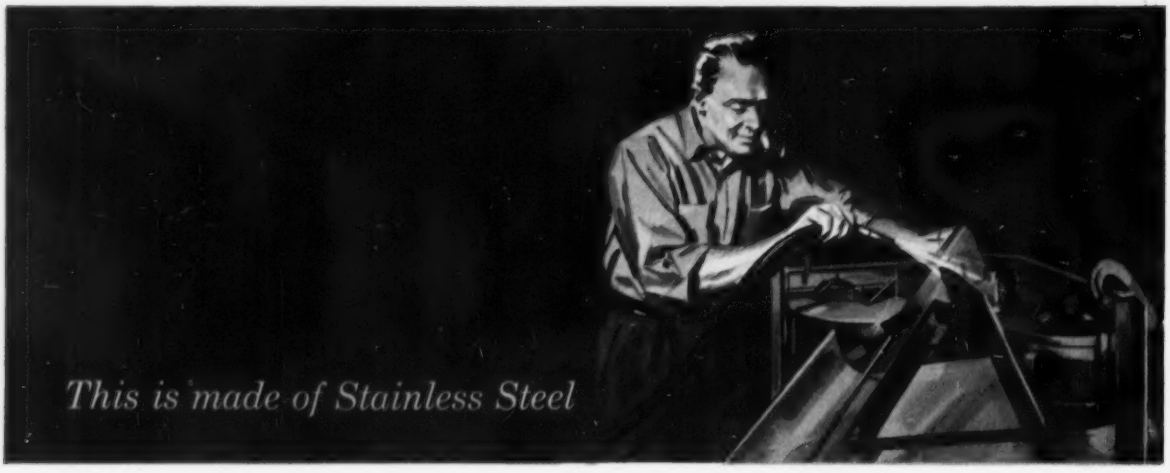


When you count the cost of cleaning... Which squeezers really cost more?

Crucible stainless steel is easier to clean, more resistant to corrosion, never chips, peels, or contaminates food

The speed at which food must be processed today means there is literally no time for slow, difficult cleaning of equipment. There's no time for replacing worn, rusted, or corroded equipment either. It's by saving time here that Crucible stainless has made its impact on today's swiftly-moving food processing industry. Crucible stainless is not only the fastest material to clean in the business, it easily withstands harsh cleaning chemicals that speed up the process but often attack other metals.

Crucible stainless always comes clean without developing rough spots that collect bacteria. No foods—no matter what corrosive acids they contain—can break down its smooth, shiny surface. The story is the same even for harsh processing liquors—no chipping, no peeling, no dissolving—so Crucible stainless never affects either flavor or appearance of food, and never takes any flavor away either.

In the long run, the more equipment you have made of Crucible stainless steel, the less you'll pay to process food.

To get all sides of the Crucible stainless story, take either of these simple steps: (1) write for free 40-page bulletin discussing the use of Stainless Steels in the Food Processing Industry, or (2) contact *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor—Railway & Power Engineering Corp., Ltd.

MEN & COMPANIES

Personnel

George W. Crabtree has been appointed general manager of Campbell Soup Co.'s container division.

M. J. Curley is new president of Old Judge Foods Corp., St. Louis, and **John W. Bush** is now chairman of board.

Cris Dobbins is now board chairman of American Crystal Sugar Co.

Alfred W. Eames, Jr., and **Oliver E. Seegelken** are now California Packing Corp. v.-p.'s.

Donald M. Kendall has been elected president of Pepsi-Cola International.

H. E. Meinhold, of Duffy-Mott Co., is new president of Processed Apples Institute. Elected v.-p.'s are **J. E. Klahre, L. W. Brown,** and **E. J. Yoder.**

Lloyd C. Mitchell, an FDA food research chemist, has received AOAC's first Harvey W. Wiley Award. Cited are his many contributions to analytical methods.

Gordon W. Ryan is now v.-p. and general manager of General Mills (Canada) Ltd.

John Schmidt has been elected financial v.-p. and secretary of Armour & Co.

David E. Stine has been named manager of the Dole can plant in Honolulu.

William B. Traynor is retiring as chairman of board of Libby, McNeill & Libby. **Harold W. Souther** has been named a director.

Ed Walzer is new public in-

New president of Curtiss Candy Co., pioneer Chicago confectionery firm, is William C. Jakes.

William C. Jakes —*Heads Curtiss . . . Firm Divisions Re-Grouped*

Beginning his career with Curtiss' sales division 26 yr. ago, he then switched to the manufacturing end and subsequently rose through the posts of plant superintendent, personnel director, production manager and, most recently, v.-p. of the production division.

In his new position, he will continue to direct the expanded research, development, and quality control programs. This is in phase with the company's current moves to streamline operations and marketing.

Curtiss' new program has boosted the board of directors from five to nine members, with James Delaney, who'd been interim president, as chairman.

In a major move to modernize the internal organization, the firm's twelve divisions have now been re-grouped into three consolidated divisions, each headed by a v.-p.

Vice-president of the new production division is John C. Otto, while R. F. Lindquist is v.-p. in charge of the newly created finance and administrative division. Heading the sales division is Vice-President P. B. Schnering.

The company employs 5,000 people in eight plants —six in the Chicago area and one each in Dallas and York, Pa.

Fancy Pack

French Style Cut Beans
from No. 4 and No. 5 sieve size round pod beans
with the URSCHEL Model "W"

Now, your round as well as flat podded beans can be cut with the Urschel Model "W" into the finest, most appetizing French Style Strips for a premium pack that brings a premium price. The new unit also gives you the advantage of a more standardized operation, since all your bean packs can now be made from round podded beans.

For complete information, promptly, write today to:

URSCHEL LABORATORIES INC.
VALPARAISO INDIANA

Designers and manufacturers of precision, high speed cutting equipment for food products

For more data, circle this page number on card at back →

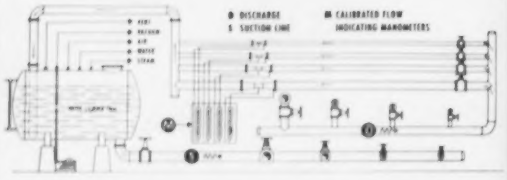
HOW! PUMP USERS!

Would you like to have your Process Pumps pre-tested under service conditions?

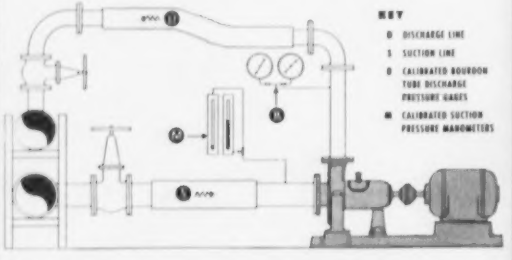
★ Dean Brothers modern test circuit is a closed, recirculation system as are many process systems. This arrangement permits simulation of process conditions for proving pump performance. Modern instruments produce reliable data on head, capacity, NPSH and efficiency.

Dean Brothers standard centrifugal process pumps are tested on the same system used to provide reliable research information.

The Best is our Standard



▲ *Schematic Flow Diagram of Dean Brothers Test Floor —a closed system with connections to surge tank for vacuum, air pressure and steam heat.*



▲ *Schematic Diagram showing pump installed for test.*

WRITE FOR SPECIFIC APPLICATION OF OUR TEST EQUIPMENT TO YOUR REQUIREMENTS

DEAN BROTHERS PUMPS INC.
EST. 1869
323 West 10th St., Indianapolis 7, Ind.

formation director of Grocery Manufacturers of America.

Industry

Ambrosia Chocolate Co., Milwaukee, has begun a $3¾ million expansion program.

Christopher Dairy Farms, San Francisco, has moved to a new multi-million dollar plant. The two-story building has 40,000 sq. ft. of space.

Consolidated Foods Corp., Chicago, has acquired **Phillips Packing Co., Inc.**, Cambridge Mass. In their joint statement, they pointed out that Phillips will continue processing but under new name of **Coastal Foods Co.**

Folger Coffee Co.'s new modern plant has started roasting and packing in Compton, Calif.

Herlihy Bros., Inc., and **Whiting Milk Co.**, both Boston dairies, announce they have merged.

New England Council plans a new fish products laboratory and a freeze-at-sea trawler as part of its program of aiding research.

Wagner Baking Corp., Newark, has acquired **Jones' Pies, Inc.**, of Hillside, N. J., according to a joint report.

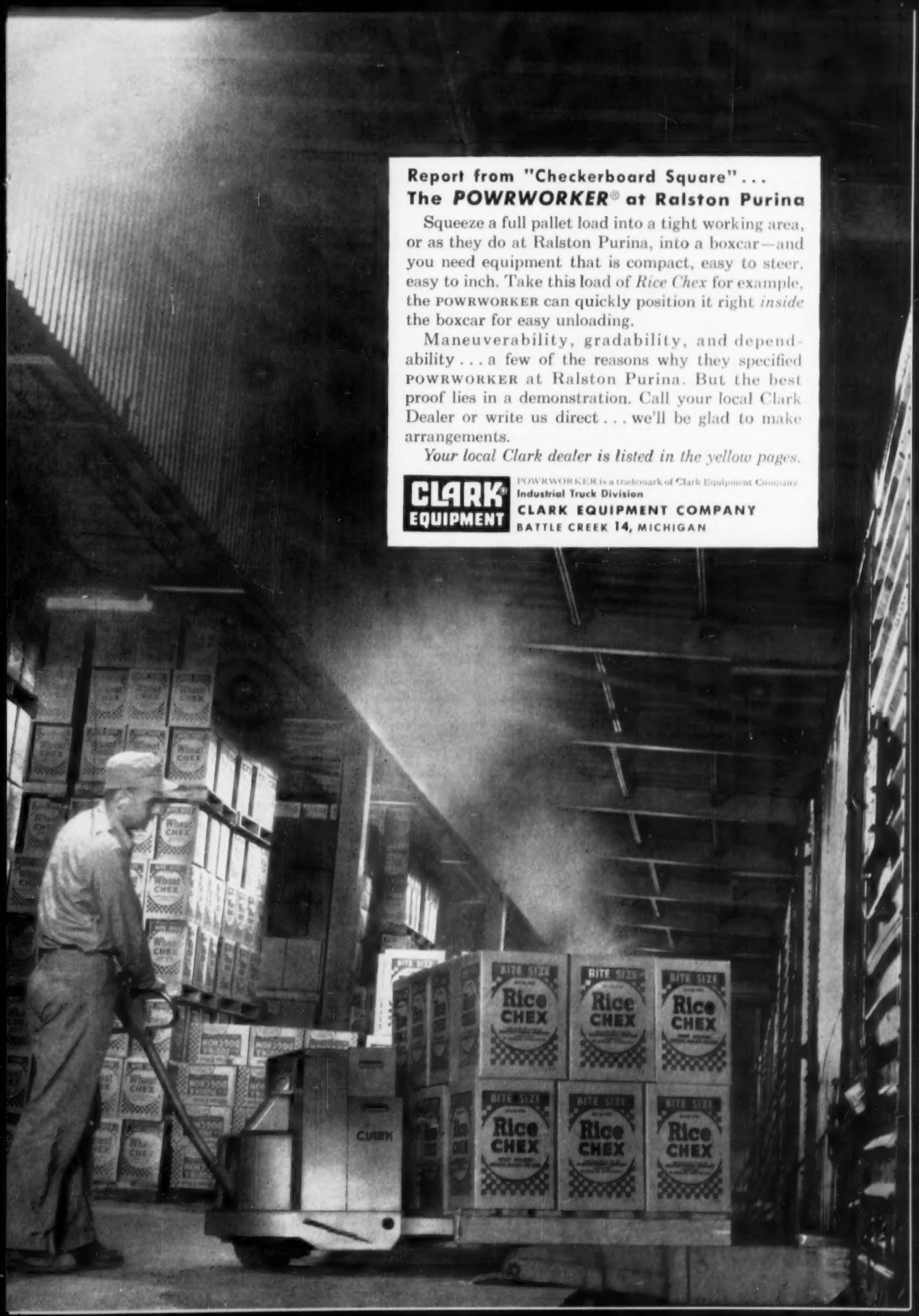
Chester J. Kwiecinski is now v.-p. in charge of production at Ambrosia Chocolate Co., Milwaukee. Steadily rising in company from initial post of night foreman, he is particularly hailed by firm for his many production-improving developments.

Theodore Hamm Brewing Co., St. Paul, reports purchase of **Rheingold Brewing Co.'s** plant in Los Angeles. Hamm's will start brewing there next spring, after completing a $4 million improvement program.

Utah-Idaho Sugar Co., Salt Lake City, will build a $3¼ million beet sugar bulk station in Seattle.

Anthony Francis is now production manager of Gorton's of Gloucester. A graduate of Bentley School of Accounting & Finance, he's held a number of executive posts with company since joining the organization as a seafood worker in 1935. Another Gorton change saw **Hugh Parkhurst** named purchasing agent. He was associated with Gorton's labs.

W. J. Aunan is first recipient of F. C. Vibrans Senior Scientist Award of American Meat Institute Foundation. Cited as "an outstanding scientist in meats research and teaching," Dr. Aunan is working this summer with AMIF labs. He will resume his post as associate professor of animal husbandry, U. of Minnesota, this fall.



Report from "Checkerboard Square"...
The *POWRWORKER*® at Ralston Purina

Squeeze a full pallet load into a tight working area, or as they do at Ralston Purina, into a boxcar—and you need equipment that is compact, easy to steer, easy to inch. Take this load of *Rice Chex* for example, the POWRWORKER can quickly position it right *inside* the boxcar for easy unloading.

Maneuverability, gradability, and dependability... a few of the reasons why they specified POWRWORKER at Ralston Purina. But the best proof lies in a demonstration. Call your local Clark Dealer or write us direct... we'll be glad to make arrangements.

Your local Clark dealer is listed in the yellow pages.

CLARK® EQUIPMENT

POWRWORKER is a trademark of Clark Equipment Company
Industrial Truck Division
CLARK EQUIPMENT COMPANY
BATTLE CREEK 14, MICHIGAN

diSPo products reduce time-wasting lab chores and cut costs 3 ways

1 They're so economical—you use them once and then discard them.

2 They reduce routine lab work—no need for washing, sterilizing, storing.

3 They increase accuracy—by preventing cross contamination.

diSPo-wraps—for fast, convenient sterilization of pipettes and petri dishes. Transparent glassine is permeated by steam for complete sterilization. Self-sealing, pressure-sensitive adhesive.

No. 62124—**diSPo-wraps for petri dishes**—fit 60 mm or 100 mm dishes. 2,000—$27.50

No. 67795—**diSPo-wraps for pipettes**—for sterilization of one or two pipettes. 19" x 1¼". 1,000—$10.80

diSPo-dishes—made of pyrogen-free clear plastic, contain no inhibiting agents and are inert to most biological reagents. Uniform—optically clear—scratch free—no lime fogged plates. Complete with cover.

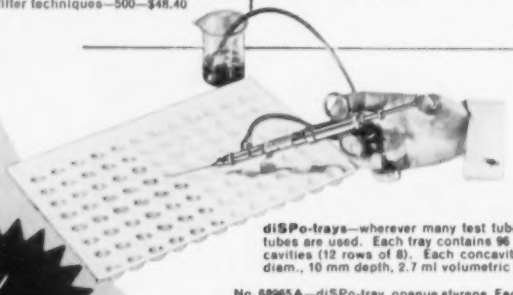
No. 62088B—100 mm dish—500—$40.00
No. 62089—150 mm dish—100—$37.50
No. 62087—60 mm dish—500—$32.75
No. 62086—50 mm dish—for membrane filter techniques—500—$48.40

diSPo-funnels and support—for preparing protein-free filtrates. diSPo-funnels are made of thin, non-wetting plastic—strong enough to be used several times and then discarded. Unaffected by inorganic chemical solutions. Volume—10 to 15 ml. Use with 9 cm filter paper.

No. 64290—100 diSPo-funnels—$4.50
No. 64291—support—$1.50

diSPo-cups—the safe, convenient way to store or transport lab specimens. Plastic coated interior resists leakage or absorption. Space on cup and cap for data. 8 oz.

No. 61785—250 diSPo-cups—$10.00



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Beatrice and Bond Merge

"Welcome to the family," says President W. G. Karnes (left), of the Beatrice Foods Co., as L. H. Bond (right), head of 40-yr-old Bond Pickle Co., Oconto, Wis., signs merger papers. Mr. Bond will continue to head pickle firm, which will retain its identity in new setup.

Associated Industries

American Can Co. has elected Clarence L. Van Schaick v.-p. He was formerly president of Dixie Cup Co., which has recently merged with Canco.

Roy E. Morse, professor of food technology, Rutgers U., has been named chairman of Committee on Animal Products of Advisory Board on Quartermaster Research & Development.

Continental Can Co. has optioned property in Merced, Calif., where it plans to build a $3½ million plant.

Griffith Laboratories, Inc., Newark, has broken ground for its new plant in Union, N. J.

Pacific Intermountain Express, Oakland, has named A. S. Glikbarg its president and chief executive officer. C. E. Johnson is named board chairman.

Deaths

Clement W. Norton, Sr., 64, president of Northwest Poultry & Dairy Products Co., Portland, Ore.

Frederick P. Siebel, Sr., 84, brewing pioneer and board chairman of J. E. Siebel Sons' Co., Inc., the Siebel Institute of Technology, Chicago.

William T. Walsh, 70, sales and advertising manager of Vita Food Products, New York City.

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WITH VITAMIN A POTENCY

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Pure beta carotene 'Roche' crystals The Peak of Purity

SAFE AND SURE. Beta carotene is one of nature's own coloring agents. *It belongs in foods.* Even though pure beta carotene has always been considered harmless, Hoffmann-La Roche as usual took nothing for granted. During the past three years, our laboratories conducted extensive acute and chronic toxicity tests which clearly demonstrated the safety of 'Roche' beta carotene when it was administered in massive doses to test subjects over long periods.

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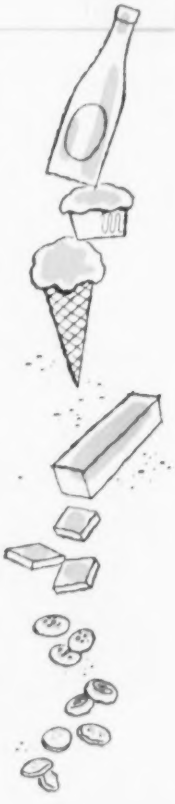
BETA CAROTENE 'ROCHE' is not a coal tar color! Beta Carotene 'Roche' does not contain coal tar! Beta Carotene 'Roche' is not in any way derived from coal tar, nor is any coal tar constituent introduced into the molecule during the Roche process of manufacture.



Since beta carotene 'Roche' gives safe yellow color with vitamin A activity (inherently included at no extra cost), it is preferred by margarine manufacturers and other food processors. We have convenient blends in sanitary tin cans or a stronger 24% semi-solid suspension (400,000 U.S.P. units of vitamin A activity per gram) in sealed, sanitary metal containers. Special forms in special packings for special purposes are available. Our technical people want to help you.

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ADVANCES IN TECHNOLOGY

Special Treatment Extends Storage Life of Cream

Use of higher temperature and shorter times in processing of cream for frozen storage is suggested by recent research on importance of these factors on production of sulfhydryl (SH) compounds.

Maximum concentration of these compounds in 40% cream was achieved by heating to 190F. and holding for 5 min., and 72% were produced during the flash-heating period of 30-sec. Prolongation of the holding period beyond 5 min. caused a marked reduction in the SH groups.

At 170 and 180F., maximum concentrations of SH groups were obtained by holding 20 and 10 min., respectively, SH concentration being higher at 180F.

A direct relationship was noted between fat levels and active-SH group production when creams of 20, 30, 40, and 50% fat were flash heated. As exposure time was extended to 5-min., however, the values became nearly the same.—*J. of Dairy Science*, 297-308, March 1957.

Color of Sugar Cookies Influenced By Storage

Stability of the brown color in sugar cookies containing small amounts of dextrose is improved by packing in low relative humidity and N_2, and by storing at a low temperature.

This was determined by subjecting cookies made with sucrose, and with sucrose plus a small percentage of dextrose to various humidities, atmospheres, and temperatures for 40 days.

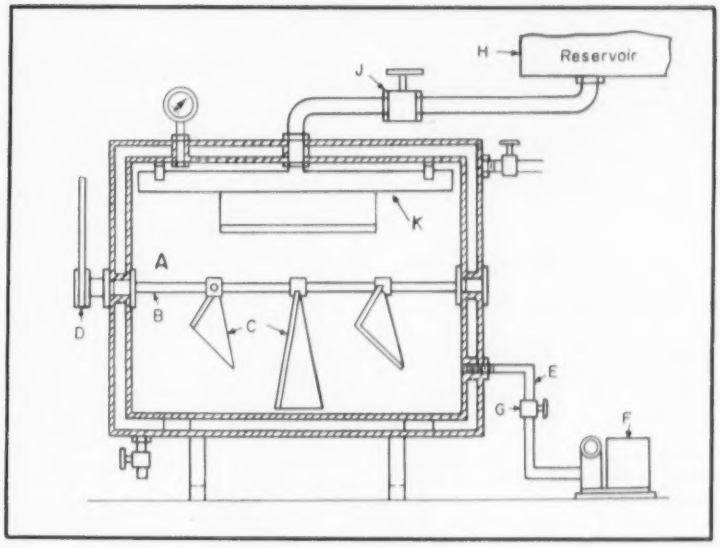
Greatest loss in brown color occurred in the dextrose cookies stored at 34% RH in CO_2. Also, storage at 34% RH and 75 and 100F. caused significant decreases in color. Storage at 160F. caused increased browning after the 8th day.—*Cereal Chemistry*, 153-59, May 1957.

Improved Pie-Crust Mix

Marketed as a solid block instead of a free-flowing mixture, a pie-crust mix has been patented that requires only the addition of water to be rolled into the conventional pie crust.

Advantages claimed for the product are: (1) A higher level and greater efficiency of shortening; (2) more intimate mixing of shortening and flour; (3) improved dough-rolling quality and tenderness of product.

In production, shortening is added to a mixture of flour and salt and mixed until it is thoroughly greased onto the flour. Product is then fed



Special Food Flavoring Composition By Vacuum-Absorption Process

Prime objective of a recently patented invention is incorporation of flavors in an absorbent carrier, in which form they may be conveyed to various foods.

The process is particularly concerned with impregnating bland spices, such as coriander seeds, having natural antioxidant properties, with essential oils and spice extractives that are subject to deterioration through oxidation. However, it may be applied to herbs, dehydrated vegetables, or other absorbent materials.

Apparatus for carrying out the process comprises vacuum kettle (A in illustration above) consisting of outer and inner shells which form a water cooling jacket. Extending horizontally through the kettle is shaft (B) on which are mounted paddles (C). Shaft is driven by pulley (D).

Conduit (E) connects kettle with vacuum pump (F), and a feed line connects flavor reservoir (H) with spray head (K) that extends longitudinally along inner shell of kettle.

In carrying out the process, absorbent material is placed in the kettle, and a vacuum of 29-30 in. Hg is drawn and held for about 20 min. Agitator is started, valve (G) on vacuum line is closed, and valve (J) on flavor line opened permitting flavoring to flow from reservoir (H) and be sprayed onto the absorbent material.

Following agitation for about 10 min., valve leading to atmosphere is opened allowing air to slowly enter the kettle. This drives the flavoring liquid into the cellular spaces in the absorbent material. — US patent 2,786,766, March 26, 1957.

Airvan cooling and conveying systems

. . . A complete, sanitary system that cools both powdered or granular products, as it conveys.

1. Rapidly cools the product to quickly check the action of prolonging high temperature.
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to an extruder where it is still further mixed, then extruded in solid form and cut into blocks suitable for packaging.—U.S. Patent 2,791,506, May 7, 1957.

Low Caloric Pudding Mix

Extract of raw Irish moss is the critical ingredient in a patented low-calorie pudding composition of the milk-gel type.

Product is a smooth starch-like pudding, free of grainy or curdled appearance, in which the Irish moss gel is so completely distributed as not to be discernible from the pectinate complexes. It may be flavored and sweetened with non-caloric substances.

A typical mix contains, in grams per package, low methoxyl pectin, 1.3; Irish moss extract-KCl complex, 0.7; potassium citrate, 0.25; sodium cyclamate, 0.17; butter scotch flavor, 0.08; and saccharin, 0.05.

Pudding is prepared by adding to one cup of milk, stirring, bringing to a boil, and cooling. The anionic colloid of Irish moss provides the desired gelling potential with cations like potassium.—U.S. Patent 2,784,099, Mar. 5, 1957.

Cocoa Bean Fermentations

Fermentation is an inaccurate and unscientific designation of an early, and very essential, treatment of cocoa beans in the long series of steps that produce cocoa and chocolate.

True fermentation is a minor part of a process, about which very little is known. Beans are usually fermented in heaps of about 500-lb. Also used are boxes about 3 ft. square and 2 ft. deep, holding about 400 lb. For experimental purposes stainless steel tanks 2½ ft. in dia. and 3 ft. deep holding 500 lb. of beans are used. A small experimental steel fermenter holding 30-100 lb. has also proved successful. These small units are heated by kerosene oil burners.

Experiments showed that the heap, box, or vessel methods could all yield well-fermented cocoas. Unripe beans, beans that had been harvested and transported 50 miles or more, and beans that were held a week after harvest could all be fermented to yield cocoas of good quality, indistinguishable from each other. Temperature, pH, and moisture cycles were found virtually identical.

During fermentation pH of pulp rises to about 4.5 on the 6th day while that of the cotyledons falls from 6.6 to 4.5. On drying, pH of cotyledons increases to about 5.4. Moisture increases from 35-40% during fermentation, then falls to 6-8% during drying.

During the first 2-3 days of fermentation atmosphere around beans is about 95% CO_2, thereafter the CO_2 drops and by 80 hr. the gases are 20% O_2. Temperature rises from about 75F. at the start to 112 after 60 hr. and approaches 123F. during the last 3 days of fermentation.—*J. of Science of Food & Agr.*, 8(2) 65-72, 1957.

Riboflavin In Wines

Grape musts contain relatively small amounts of riboflavin (7-60 mcg./l.), but by about the 10th day of fermentation the content approximates 200 mcg./l. when *Saccharomyces ellipsoideus* is the yeast.

Well aerated fermentations produce wines higher in riboflavin than those from which air is excluded. White Bordeaux wines in casks (1952-1955) were found to contain 35-219 mcg./l. Bottled white Bordeaux contain smaller amounts (5 to 106 mcg./l.) Red wines were richer in the vitamin (50-362 mcg./l.).

Fining of wines with casein, gelatin, or egg albumen does not affect their riboflavin content. But adsorption materials, such as activated carbon and bentonites remove riboflavin, and ion exchange materials may have a similar effect.

Assuming an adult daily requirement of 2 mg. riboflavin, a l. of red wine will contribute about $\frac{1}{10}$th of this, while contribution of a white wine is negligible.—*Revue des Fermentations et des Industries Alimentaires* 12(1), 9-14, 1957.

Malo-Lactic Fermentation For Low-Acid Wines

Wines high in tartaric acid usually have their acidity reduced by precipitation with $CaCO_3$. Musts low in tartaric acid, but high in malic acid, cannot be treated in this way, and for production of low-acid wines the malo-lactic fermentation is desirable.

The responsible organism, *Bacterium gracile*, is a small coccus about 0.5 microns in dia. Under optimum conditions of growth it appears in groups of 2 or 3 cells at most. In high alcohol wines (14%) it takes

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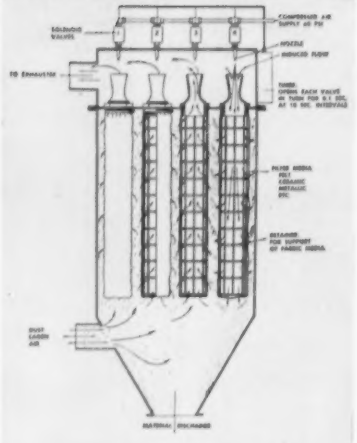
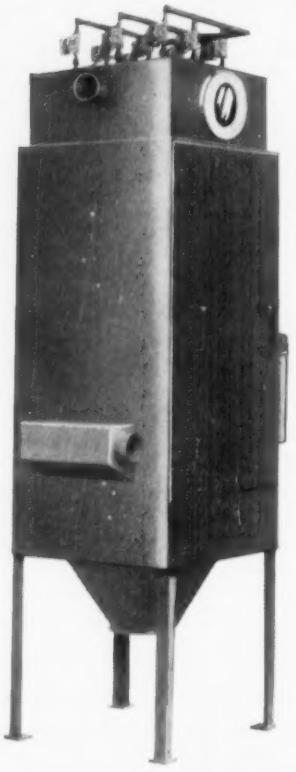
The most costly factors in collector maintenance have been eliminated . . . that means all mechanical cleaning mechanisms with their gears, cams, chains, etc. Now, in the MIKRO-PULSAIRE, filter elements are cleaned in a continuous cycle by the introduction of momentary jets of high pressure air through specially contoured venturis mounted above each filter cylinder, individually controlled by a timed solenoid.

The MIKRO-PULSAIRE Collector is a completely simplified unit, yet capable of cleaning and filtering a dust-laden air stream at constant pressure and volume efficiencies equal to, or better than, any other automatic filter type collector. Efficiency of collection on one dust having 0.1 micron, ultimate particle size, averaged 99.9%+ at 50 grains per cubic ft. dust loading.

For more information on the MIKRO-PULSAIRE Collector, write for Bulletin 52A. In addition, we will be glad to make specific recommendations regarding your particular application requirements.



Schematic diagram showing flow of dust and air, and arrangement of filter cylinders in the **MIKRO-PULSAIRE Collector.**



MIKRO-PULSAIRE Model 9-4

The Model 9-4 MIKRO-PULSAIRE Collector has 42 sq. ft. of filter area, and is capable of operation at approximately the same filter ratios as conventional fabric type dust collectors. Unit handles between 400 and 600 cfm of dust-laden air. MODEL 48-6 has 340 sq. ft. of filter area for capacities from 2000-5000 cfm. Units also available for intermediate and larger capacities.

*Patents applied for.

Mikro-D

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the form of very long streptococcal chains. It dehydrates malic acid to pyruvic acid and CO_2 in the presence of Mn. and diphosphopyridine nucleotide (DPN).

The reduced DPN then gives up H to the pyruvic acid to form lactic acid and DPN. Citric acid is also acted on by the bacteria, but not tartaric.

In wines of high acidity and low pH the malo-lactic conversion may be slow to start (63 days in a *Pinot noir* wine of pH 3.2, compared to 15 days for a pH 3.9). High alcohol is also somewhat inhibiting. A *Pinot noir* wine of 9.4% alcohol by volume required 63 days for malic acid retrogradation to start, compared to 13 days when alcohol was 3.05%. The bacteria also require the presence of riboflavin, pantothenic acid, niacin, and folic acid for growth.—*Revue des Fermentations et des Industries Alimentaires*, 12(1), 15-21, 1957.

Wine From Grass

Development of bouquet in wines made from the fermented juice of fruit other than grapes can be accomplished by addition of an extract of grasses.

As revealed in a patent, this extract may be made from grass in the fresh condition or dried as hay. The extract produced by crushing, macerating, boiling, digesting, percolating or like treatments.

By way of example: One part by weight of grass (or ¼ part of hay) is boiled with 4-5 parts of water, filtered and pressed, yielding about 4½ parts of liquid. Sugar is dissolved in this liquid (270g. per l.) and fruit juice (50-100 g/l) is added. Mixture is then subjected to fermentation. After some weeks the liquid is converted into an alcoholic beverage having the taste of wine and an alcoholic content of about 15%.—U. S. Patent 2,608,484, Aug. 26, 1952.

How Milk Powder Prevents Sandiness In Ice Cream

In ice cream to which milk powder has been added, lactose crystallizes rapidly, at essentially the same rate as in the seeded product. It causes the supersaturated lactose to be deposited as small, insensible crystals rather than large, slow-dissolving ones.

This is in contrast to the previously accepted explanation that the lactose of the powder did not dissolve because the partly frozen mix was saturated with respect to lactose.

Polarimetric readings show that the lactose glass of the powder produces a multitude of crystal nuclei when introduced into the partially frozen mix. These nuclei serve as seed, causing the supersaturated lactose to be deposited as small undetectable crystals.—*J. of Dairy Science*, 309-13, March 1957.

Careless Handling Affects Freezing Point of Milk

Normal processing procedures do not influence the freezing point of milk. However, careless practices on the part of producer and processor, cause dilution which is responsible for the high freezing points of much bottled milk.

These are findings of a recent study, major objectives of which were to: (1) Determine freezing points of milk from individual cows and herds, and commercial market milks; and (2) study processing operations for factors influencing it.

The following freezing points were determined: Milk obtained directly from cows, −.546C.; as received at plant, −.538C.; after transfer to storage tanks, −.533C.; from retail outlets, −.530C. Only 57% of samples were within the 3% added water tolerance permitted by the official method with a standard freezing point of −.550C.

Careless flushing of water through storage tanks, HTST pasteurizers and other equipment was found responsible for the dilution observed.—*J. Dairy Science*, 410-17, April 1957.

Simulated Hamburger

Having the appearance of ground beef, a nutritious food product can be prepared from inexpensive byproducts such as lips, cheek trimmings, tripe, lungs, udders, ears, etc., that ordinarily are not consumed as food.

According to the patented procedure, a mixture of these byproducts, normally frozen, is shredded in an impact disintegrator then ground in a sausage machine. During the shredding and grinding, temperature rises to 35-40F. so that the material flows freely through the machines.

Appearance of red beef is imparted by blending a certain percentage of melts—glands consisting of a red bloody substance. Other suggested ingredients may be ground

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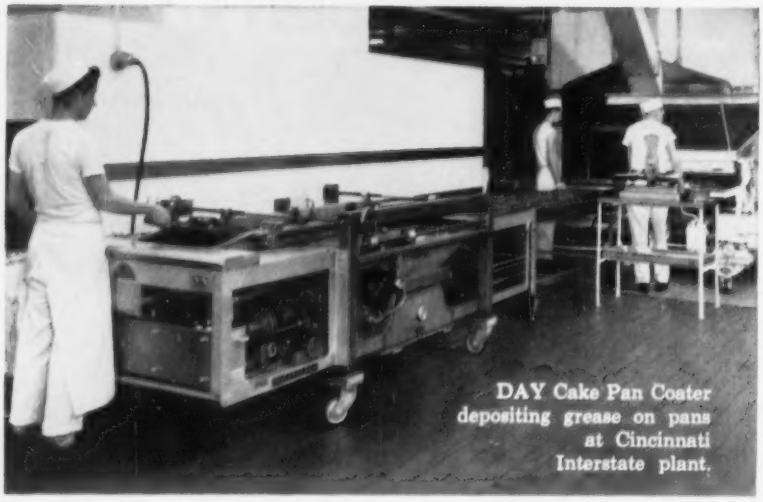
this new DAY cake pan coater pays for itself in only one year



DAY Cake Pan Coater depositing grease on pans at Cincinnati Interstate plant.

■ 50% grease savings – plus $1200 per year saved in power costs

Adding liquid shortening to DAY Cake Pan Coater at Los Angeles Interstate plant.

DAY Cake Pan Coater operation insures clean pans.

That's the story at the Chicago, Los Angeles, Cincinnati, Birmingham and Greensboro Dolly Madison plants of Interstate Bakeries, where *twelve* DAY Cake Pan Coaters are in operation. This new pan coater covers the insides of cake pans more completely with less grease than any other commercial machine available today. Operation is virtually trouble-free because:

- no air system is used
- no nozzles to clog
- no filter is needed
- no overspray...no need for hood or exhaust duct

Templates restrict grease spray to pan cavities only, and they can be made for any kind of cake pan. Entire machine is sanitized. Write for specifications.

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Advances in Technology

sterilized bone meal, ascorbic acid, sodium salicylate, or benzoate of soda.

As a final additive, a moisture absorbent is included which is effective in preventing oxidation and evaporation. Following final blending, the composition is ready for packaging and freezing.—U.S. Patent 2,791,507, May 7, 1957.

Salt-Tolerant Bacteria

Salted fish, meats, hides, and both natural and artificial brines are sometimes infected by halophilic, or salt-tolerant, bacteria.

Several genera contain species that are able to grow and affect the composition of their substrate in the presence of 15% or more of salt. Including are species of *Pseudomonas*, *Bacterium*, *Sarcina*, and *Micrococcus*. Their metabolism is affected by salt concentration, however, so that reports of the inactivities should include mention of the salt concentration present or used.

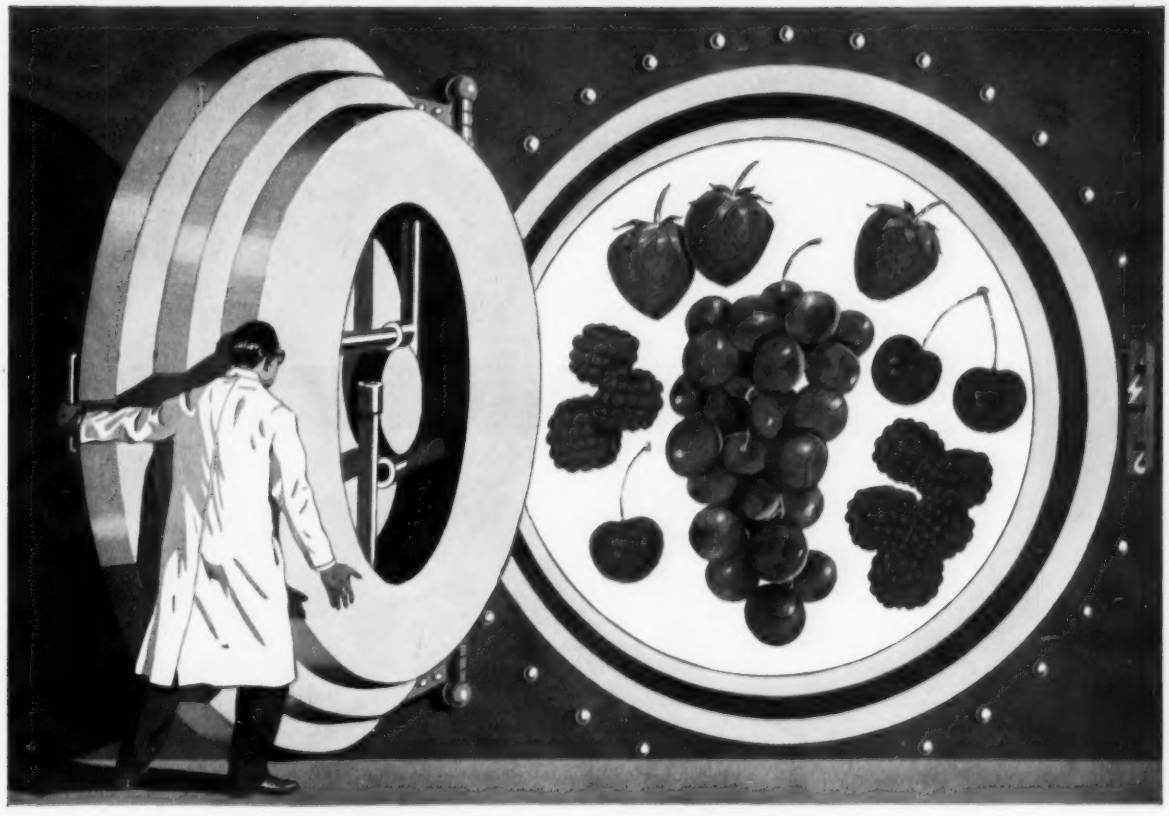
Hydrogen sulfide production by *P. salinaria* and *B. halobium* did not begin until salt concentration reached 25%, while a strain of rods (N_s) produced the gas only below this salt concentration. Indol concentration was maximum in the media at 20% salt for all strains tested. Its production differed with bacterial strain at other concentrations. Rod bacteria producing red pigments among the halophiles do not reduce nitrate to nitrite, but the red cocci do, their response varying with salt concentration in some strains. Degree of pigmentation among red forms was maximum at 20% salt. Colonies of some cocci are dull and dry at 15-20% salt but become smooth and shiny at 25-30%.—*Canadian J. of Microbiology*, 249-55, Feb. 1957.

Bacteria In Margarine

Oleomargarines can develop oxidation rancidity as a result of autoxidation at double bonds of the fats, hydrolytic rancidity due to splitting of triglycerides into glycerol and fatty acids, and the so-called "perfume rancidity" in which methyl-alkyl-ketones are produced usually by the action of bacteria.

Lipase-producing molds, most of them species of *Aspergillus*, bacteria (including such common ones as *Bacillus subtilis*, *Escherichia coli*,

The flavor is LOCKED-IN!



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ELIMINATES ADJUSTMENT BETWEEN SIZES

You can alternate one-pound and half-pound packages on the Package FB-1 Bacon Wrapper without any adjustment. Using either cellophane or pliofilm, the self-measuring paper feed *pulls only the amount of* material needed for each wrap. Folding and sealing mechanism draws down a tight, flat, air-sealed package to preserve quality and increase display value. Intermittent chain flight conveyor carries individual packages, makes machine self-clearing.

Speeds on the Model FB-1 are adjustable between 20 and 50 packages a minute with a simple handwheel control. All surfaces contacting the package are sanitary stainless steel. Reciprocating sealing plates are teflon-coated to prevent the accumulation of sticky carbon and bacon grease. Self-aligning bearings and rugged steel frame help reduce down time, add to useful service life.

You can wrap in a size range from 8½" to 11½" long, 3½" to 8" wide, and ⅛" to 1" high on the Model FB-1. For full details on this bacon wrapper, which major packers have now standardized on, contact your nearest Package representative.

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Serratia marcescens, and *Pseudomonas fluorescens*), and yeasts of the *Torulopsis* and *Rhodotorula* genera are most often responsible for hydrolytic rancidity.

Presence of these bacteria is disclosed by the Britse method of plating on tributyrin agar.

Oleomargarines can vary widely in numbers and types of organisms and, in older samples, total counts may be quite high, up to 60,000/g. or more. Turner's method of adding Nile blue to a coconut oil emulsion agar will also indicate presence of fat-splitting bacteria.—*Fermentatio*, No. 2, 76-84, 1957.

Methods For Determining Gravity of Confections

Specific gravity can be an important consideration in the production of confectioneries that are sold by the piece rather than by weight.

If little or no control is exercised, it can vary as much as 10% up or down, and the fluctuations may seriously upset cost calculations. A certain degree of control can be obtained by weighing pieces regularly, but variations in the sp. gr. may still be obscured by differences in size, thickness of chocolate coatings, or amount of filling.

Processing variations can be eliminated more satisfactorily by direct determination of the sp. gr. of particular batches of ingredients. Frappes and marshmallows can be filled into a measure of known volume and weighed directly. Solid pieces can be weighed first in air, and then in a liquid of known gravity such as acetone, isopropyl alcohol, or ethyl acetate, and their gravity calculated.

A third, somewhat less accurate method, is to prepare mixtures of trichloroethylene and hexane of differing gravities, from 0.70-1.40, for example, and submerge the pieces in them. Gravity of the piece is equal to that of the liquid in which it neither sinks nor rises.

Specific gravities of some common confectionery products are: Fondant 1.50, frappe 0.40-0.60, nougat 0.70-1.20, toffee and soft caramel 1.00-1.40, hard caramel and hard sugar candies 1.30-1.50, jellies 1.35-1.45, marshmellow 0.20-0.50. — *International Chocolate Review*, 88-91, March, 1957. (English and German.)

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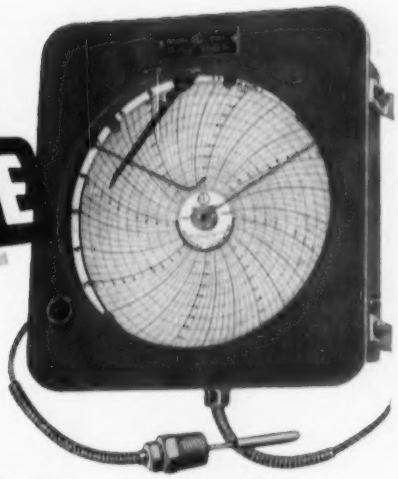

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QUESTIONS & ANSWERS

THIS MONTH'S PROBLEM

Difficulty With Slurry

Question—We have begun production of an item that requires making a slurry of solids in a water-like liquid. For this step, we employ two cylindrical open-top tanks, each equipped with a portable 1-hp. propeller-type mixer. We happen to have these units on hand and, in general, they seem to do a fairly adequate job.

However, we are perplexed by the fact that mixing is not consistent. Occasionally, solids accumulate in tank bottoms for no apparent reason. Another difficulty is that some particles (the lighter ones) seem to be more easily suspended than others.

We have very carefully checked our materials, order and rate of addition to tanks, etc., and can find no variables that would account for these erratic results. Have you any suggestions?

JUNE PROBLEM

Buying New Equipment

Question—I am the engineer in a small processing plant located in a predominantly agricultural area. Supervision and management here are quite conservative, and tend to be suspicious of new equipment or processes that they have not actually seen. From talking to salesmen, I feel sure that I could introduce at least two or three modern pieces of equipment that would improve our products and reduce costs.

However, I am unable to convince our manager that he should approve the money for purchase of these units. Perhaps some of your readers may have encountered similar frustration, and may have found a formula for solving my problems. If so, I'd like to learn about it.

Answer—Basically, the problem is to convince your manager that what you are proposing is sound, practical, and to your company's (and his) advantage. Apparently, he's not impressed by advertising or sales claims as much as he is by actual first-hand observation. This commendable caution naturally limits him somewhat in adopting new equipment or ideas —especially in view of your plant's location.

We gather, too, that some other key people—perhaps foremen and production superintendent — are similarly inclined. You will probably have to convince them before you can win over your plant manager.

We suggest that you take one of your most promising ideas and carefully plan a program, based on *renting* the equipment for a limited period of time. If you can first enlist the full cooperation of the equipment manufacturer, it should not be difficult to arrive at rental terms that will protect the interests of both parties.

After all, the manufacturer has confidence in his equipment and usually is eager to have a chance to prove its worth. Therefore, you can suggest that he *offer* a rental, so that you can take it up with your management for approval.

For such a rental proposition to be of value, it should specify—preferably in writing—rental time, charges, value of machinery (so you can insure it), shipping weight (to estimate transportation costs), and any "reconditioning charges" that may be made when equipment is returned.

Naturally, it is desirable to arrange that rental payments apply to any future purchase. Other information that should be included relates to electricity, water, steam, etc. needed to operate the device. You'll also want to know the size of required wiring and piping connections.

If any auxiliary equipment, such as stands, drives, or hoods are needed but not furnished, it should be spelled out in the rental terms.

When you have secured such a rental proposal, you are well on the way.

Second step is even more vital. It involves estimating, as carefully as possible, potential advantage from adoption of the equipment. Along with this estimate, you will want to list all the advantages you and the equipment company can think of. You must also show estimated costs connected with rental.

Final step is presenting the request to your management for approval to rent. You, of course, know the people you are dealing with However, it would seem logical that you check the idea first with the plant supervisors. If they are persuaded that such a plan is ideal for them, the presentation to the manager can be on the basis of approving only the relatively small expenditure for rental.

At this point, it should be emphasized that this technique requires a very clear-cut understanding by all parties that there is *no obligation*, no matter how satisfactory the rental period may prove. You must maintain your freedom of choice and action, so that no one will have the feeling that someone else has "put one over on him."

Moreover, this sense of fair play will often lead to ready approval. For if an equipment company is willing to enter into a no-obligation rental just to prove its equipment, your manager or anyone else will usually want to give them that sporting chance.

Another Answer

I am in charge of a food-research laboratory and have encountered the same difficulty in convincing management to buy new instruments to be used for analysis. I talk to quite a few salesmen who agree to lend the instrument for a short time on an approval basis.

During this period I work with the

HOW TO DO IT?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise). We pay space rates.

JUST ASK US

Subscribers also are invited to send in food engineering questions. We undertake to provide answers free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

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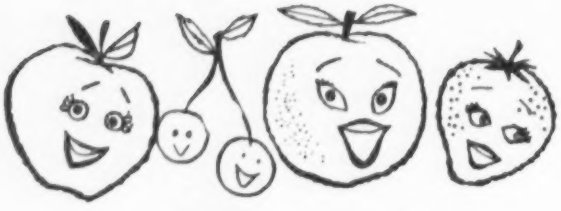
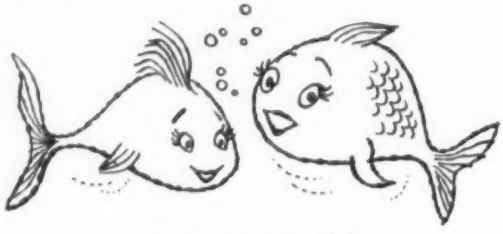
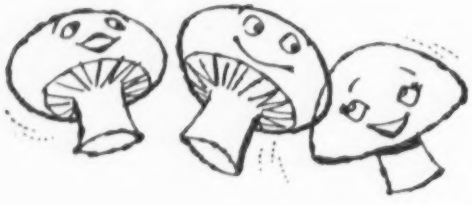


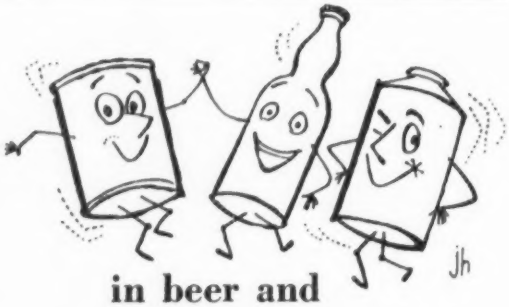
in frozen fruit



in frozen fish



in processed mushrooms



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instrument and, if I find it saves time and money, I don't have to convince management. The instrument speaks for itself.

So, I suggest that next time any salesman comes around, talk him into lending you the equipment for trial. Before requesting such a loan, I strongly recommend that you study the equipment thoroughly with respect to savings versus cost. All reputable firms will cooperate. In fact many will supply technical help and attempt to solve your problem as if it were their own.—*B. R. Suri, Food Technologist, Pittsburgh.*

Heat-Indicating Paint

Question—We've heard of a paint that changes color when applied to canned foods subjected to heat-sterilization in retorts. Do you have any more information on it as well as who makes it?

Answer—A specially formulated paint (X-13), which is manufactured by Easterday Paint & Chemical Co., Racine, Wis., is dabbed onto one or two top cans of retort crates going into pressure cookers. Purpose, of course, is to prevent mis-cooks and under-cooks.

This blue paint changes to white when exposed to heat and steam. And when it does, crate is allowed to pass on to case packer. If, on the other hand, paint remains blue at end of cook, cans are opened and inspected.

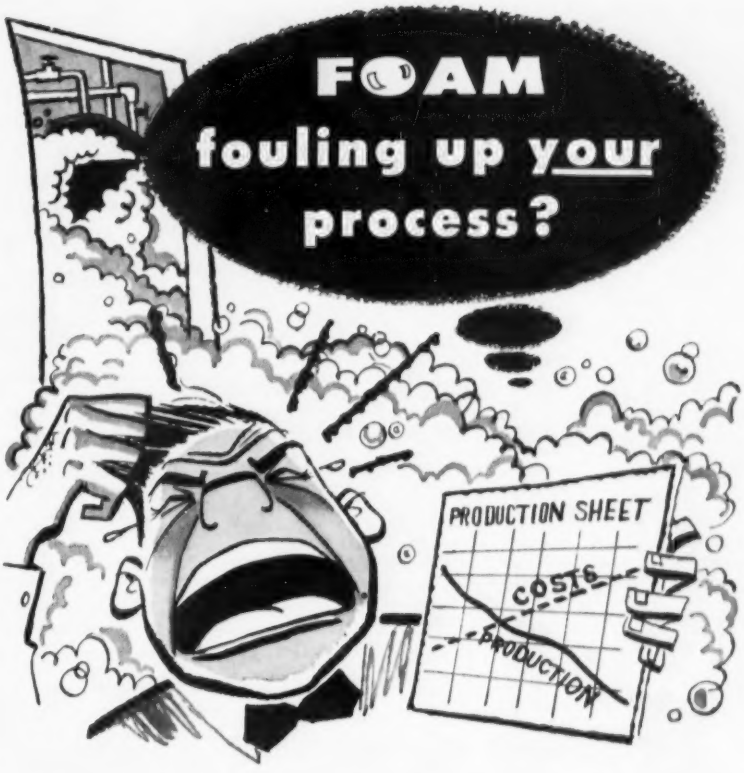
Product was developed to react primarily at temperatures in the 240-250F. range. However, here's a schedule of other times and temperatures, along with approximate percentage paint color changes, as tested at National Canners Assn. laboratory: 45% color change for 11 min. at 250F., 75% for 20 min. at 240, 80% for 30 min. at 230, and 90% for 60 min. at 212.

Preparing Chicken Items

Question—Do you have instructions for making chicken liverwurst, salami, and luncheon roll?

Answer—We don't have too much information on these items.

As for chicken liverwurst, we don't know if this product is even on the U. S. market. You may be referring to the original braunschweiger, which was prepared from the liver



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Questions & Answers

of forced-fed geese. This fatty liver was chopped up and worked into a paste.

Another suggestion we have is that you attempt to work out a chicken liverwurst using, as a basis, the following liverwurst formula in which ground chicken (100 lb.) is substituted for pork livers and pork jowls:

Fresh pork livers, 60 lb.; fresh pork jowls, 40 lb.; finely ground onions, 3 lb.; salt, 2¼ lb.; sugar, 6 oz.; pepper, 4 oz.; sweet marjoram, 1 oz.; cardamon, 1 oz.; mace, 1 oz.; sodium nitrate, 2 oz. and sodium nitrite, ¼ oz.—*Formula by the Visking Corp.*

We've been told chicken salami used to be processed in Kosher plants. Maybe it's still being made.

It was processed, like a cooked salami, in chicken skin and wire cages to square them up during the cook.

You might try this Visking cooked salami formula, substituting chicken meat (100 lb.) for the beef, pork and pork trimmings:

Lean beef trimmings, 40 lb.; extra lean pork, 30 lb.; regular pork trimmings, 30 lb.; salt, 3 lb.; sugar, 8 oz.; ground cardamon, 1 oz.; cracked black pepper, 6 oz.; garlic powder, 1 oz.; sodium nitrate, 2 oz., and sodium nitrite, ¼ oz.

Q.—Do white- and brown-shell eggs have different food values?

A—Shell color makes no difference in food value.

Now to making chicken luncheon roll. We suggest here, too, you modify a mock chicken formula by substituting chicken for the meat.

Or you can work up a 50% chicken and gelatin blend, using chicken broth to dissolve gelatin and incorporate seasonings.

On the basis of 100 lb. of meat, you might want to add 6 oz. of white pepper, 2 oz. of celery seed, 2 oz. of mace, 1 oz. of fresh garlic, 3 lb. of salt, 3 lb. of fresh onions, and 12 lb of nonfat milk solids.

Have FE readers any other suggestions?

Making Fudge Base

Question—Can you supply me with complete directions for preparing a fudge base to be used by bakers in making up icings?

Answer—Here's a starting formula that you can modify to suit requirements:

"they step up our production — and never let us down"

"Yarways bring our kettles to a boil in about 3 minutes instead of the 20 minutes previously required."

Q. Mr. DeJulio, you use a lot of Yarway Impulse Steam Traps here in the FrigiDinner, Inc. plant. How did you first come to use them?

A. I saw an advertisement in a magazine offering a free 90-day trial, and since we had been having plenty of trap trouble, I sent for one. Within two weeks I knew it was our answer. We've purchased only Yarways since then.

Q. Briefly, what's been your experience with Yarway traps?

A. To sum it up, they step up our production, and they never let us down. Our production schedule of pre-cooked frozen dinners is pretty stiff, and time is important. In one case, Yarways cut 17 minutes off the cooking time of every batch. In another, they made it possible for us to double our production of Swiss steaks. Performance is always uniform. We can count on Yarways.

Q. What do you mean when you say, "Yarways never let us down"?

A. Maintenance—or rather, lack of it. We haven't had any troubles. In over two years, I've never had a Yarway trap apart.

Q. Do you have only Yarway Impulse Traps in the plant?

A. No, there are still a few of other makes. But every new trap installed now is a Yarway—soon we'll be 100% !

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•MIKE DE JULIO, Plant Manager, FrigiDinner, Inc., Philadelphia, Pa., manufacturers of pre-cooked frozen dinners.

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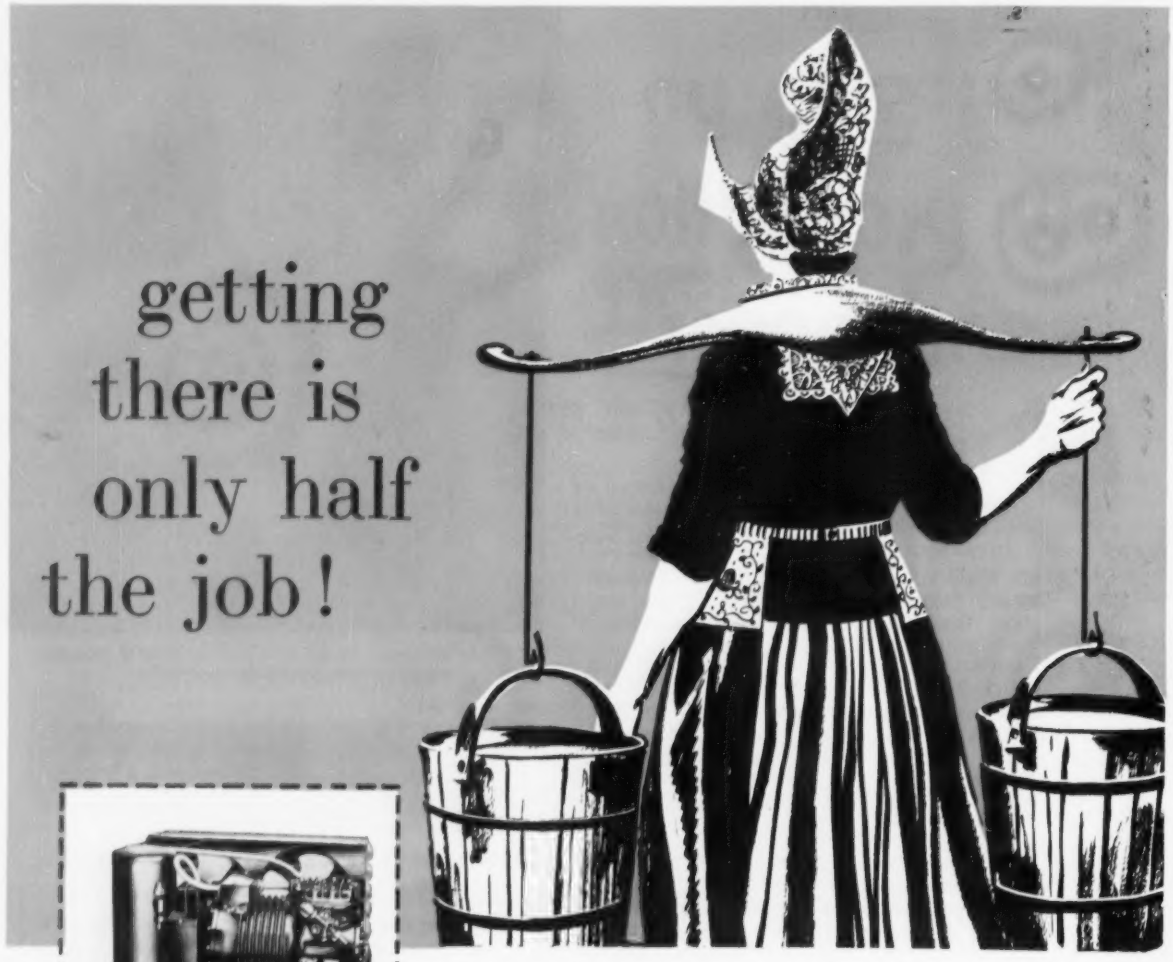

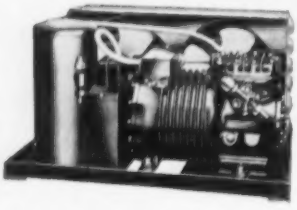

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Melt shortening (120F.), and cream in corn syrup. Add stabilizer (pre-mixed with 1¼ lb. of icing sugar) and blend along with one-half lecithin and cocoa. When extra stiff, add remaining lecithin and then the vanillins.

To prepare icing from 1 lb. of base, add 1 pt. of hot water and 3¾ lb. of icing sugar, and blend until smooth.—*Formula: Seaplant Chemical Corp., New Bedford, Mass.*

Cole Slaw Formula

Question—Has your editorial department instructions on making cole slaw to be sold from refrigerated display cabinets?

Answer—Here's a good basic formula for cole slaw that you can change slightly to suit consumer tastes in your area. But product must be kept at about 36F. from plant to consumer to prevent spoilage.

First, shred 31½ lb. of white cabbage in a slow slicer. Some processors prefer to color the cabbage with shredded carrots. Adjust total weights of the two vegetables to the above 31½ lb.

Next, blend: Salad dressing, 6⅛ lb.; vinegar, 21 oz.; top milk, 3½ lb.; sugar, 14 oz.; salt, 7 oz.; pepper, 0.875 oz.; and add paprika to suit. These ingredients can be blended in any small mixer equipped with an agitator or beater.

Dressing is then thoroughly mixed with cabbage. Product is either filled into trays for bulk-delicatessen trade or into individual plastic containers. Some work has been done on marketing the product in a plastic bag. In some installations, filling is done by hand. But there's no reason why a filler could not be used.

Also, some processors feel that storing raw cabbage-carrot mixtures overnight in charred wood barrels results in a superior flavor. Another processor tops his filled plastic containers with a spread of pure mayonnaise and a sprinkling of dehydrated parsley before capping.

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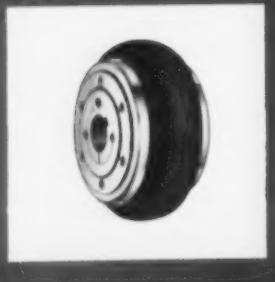

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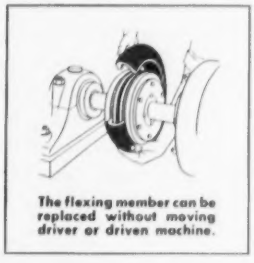
The technological advances that contribute to the miracle of today's truck tires, which are engineered to carry tremendous loads at high speeds and stand terrific shock, have made this new type of coupling possible.

The heart of Para-flex is a tire with synthetic tension members bonded together in rubber. It is pliant. It "fits itself" to changing shaft conditions—angular, parallel, end-float, *or any combination of all three!* Depending upon the size of coupling and duration of shaft misplacement, it handles angular misalignment up to 4°, parallel up to ⅛" and end-float up to 5/16".

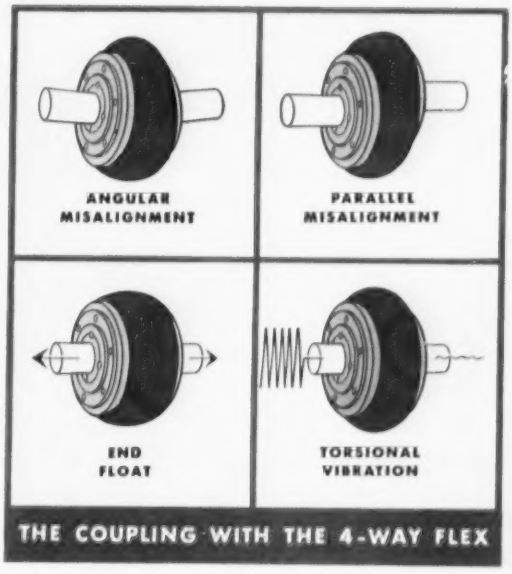
It cushions the stresses of shock loads to a remarkable degree. And it tends to absorb torsional vibration—reducing noise and protecting machinery from vibration's destructive forces.

There is no metal-to-metal contact between shafts. They are insulated. No lubrication is required.

Para-flex takes a minimum of space on the shaft. Mounting is simplified through the use of standard Taper-Lock bushings—no reboring, no machining. Safety is promoted by flush design; there are no protruding parts. And since the flexible member is molded with a transverse split, it can be replaced *without moving either the driver or driven machine!*



The flexing member can be replaced without moving driver or driven machine.



Para-flex Couplings are stocked by Dodge Distributors in popular transmission sizes. They are available from factory stock in capacities up to 600 hp at 900 rpm. Call your distributor for early delivery to *make your own test.* You'll witness something revolutionary!

DODGE MANUFACTURING CORPORATION, 2800 Union Street, Mishawaka, Indiana

DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new methods. Look for his name under "Power Transmission Machinery" in the yellow pages of your classified telephone directory—or write us.

To Produce Parts from Stainless Tubular Products Economically

The lowest possible final cost commensurate with the highest quality of the finished part is the aim of design and production engineers of equipment manufacturers.

How is this achieved in equipment used in the food, pharmaceutical and chemical processing industries?

If the part is hollow or can offer advantages by being hollow—a tube is used.

If it must resist corrosive attack and be easy to clean to provide freedom from contamination —a stainless steel is used.

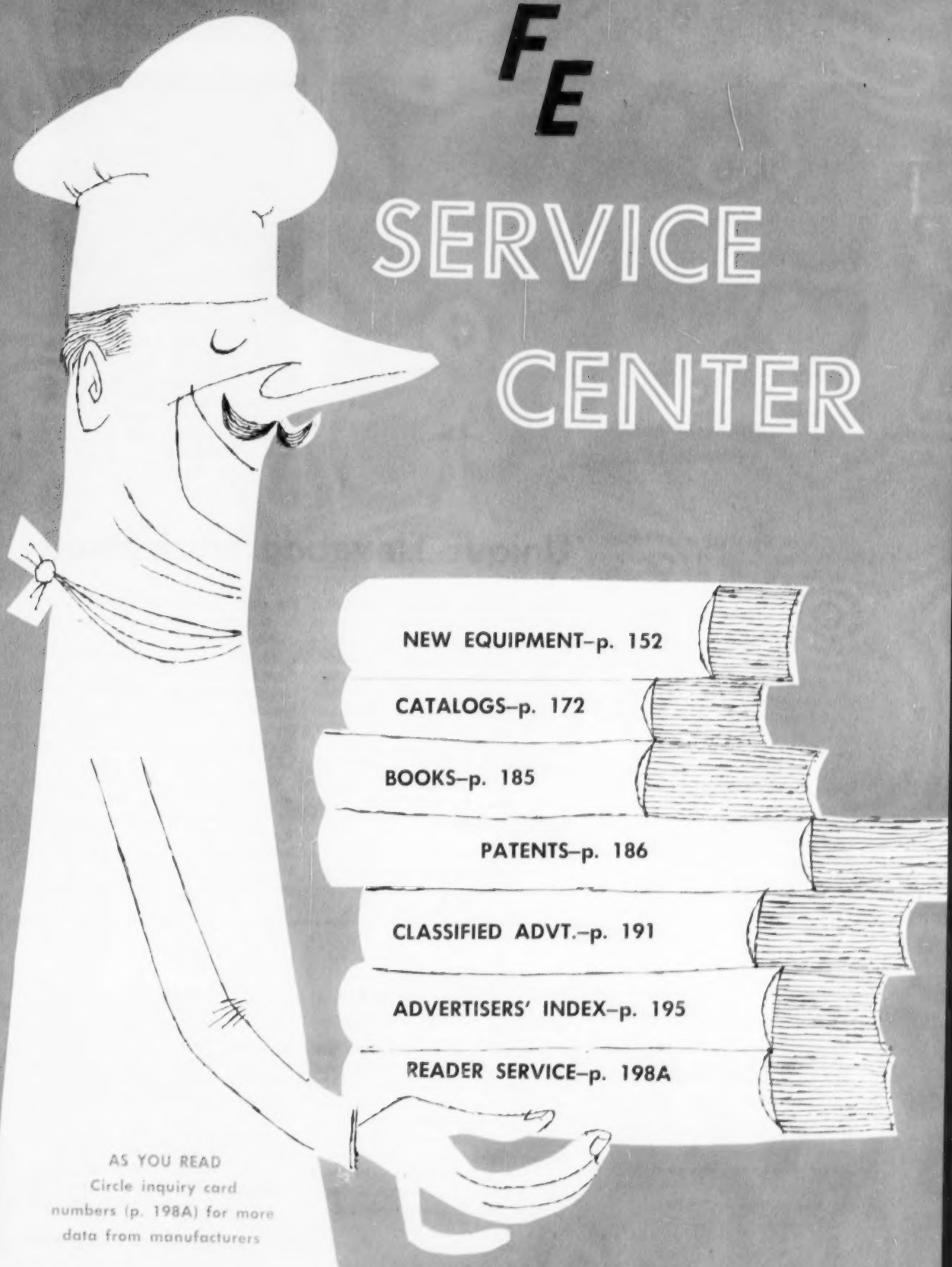
If the part is to be fabricated using operations such as bending, expanding, swaging, spinning, upsetting, machining or other methods —the material must be adaptable to the procedures.

The choice of the tube, in the proper grade of stainless steel and with the optimum mechanical properties for ease of fabrication is an extremely complex problem. Why not contact an expert—Mr. Tubes. Mr. Tubes, your local B&W District Sales Representative, can provide you with sound, practical advice on choosing the right tubing for your particular needs and help you save production time and lower your production costs. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA-7017-M7

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy, and stainless steels.

FE SERVICE CENTER



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AS YOU READ
Circle inquiry card numbers (p. 198A) for more data from manufacturers

NEW EQUIPMENT & SUPPLIES

ELEVATOR-LIKE BODY of versatile truck cuts costly curb time. Left: Actuated from control panel (arrow), body lowers and tilts to one side for gravity assist in ground-level unloading. Above: Hydraulic cylinders, one attached to each rear wheel, plus larger one at front of body, provide the power.

Unique Elevating Truck Body

With today's rising cost of truck delivery, there's tremendous interest in a radically new type of carrier whose body automatically adjusts to variable platform heights and quickly lowers to ground level.

Hydraulically controlled, the unit (Lo-Loader) reportedly cuts loading and unloading times of fixed-height vehicles as much as 75%. And it so simplifies these operations that heavy shipments often can be handled by one man.

Furthermore, this elevator-like body eliminates costly accidents that occur by lifting heavy objects into or down from a truck.

Of particular advantage in metropolitan deliveries, the body can be lowered from normal driving position to ground level in 12 sec. Thus it permits uninterrupted sidewalk-level entry through two side doors and a rear roll-up door.

For loading, the body can readily be raised to conform to any dock up to 54 in. high. In addition, it can be tilted front-to-back, back-to-front, and side-to-side to level the body floor on uneven terrain, or for gravity assist in loading and unloading.

How Unit Operates

Design of this vehicle eliminates the rear axle and conventional drive shaft, which would prevent lowering the body below driving position. As a result, drive is on the front wheels.

The body is raised and lowered by three hydraulic cylinders, one at the front end and one attached to each rear wheel. Cylinders are powered by a pump that operates from the truck's power train and develops 1,500-2,500 psi.

Connecting the body and chassis are two sets of mating channels, one set (stationary) attached to the cab, the other to the body. This frame houses the front cylinder and guides the body during lifting and lowering. This part of the elevating me-

Want More Information?

It's free — and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard — back of book. Then sign at the bottom and mail. For your convenience, too, these items are listed and keyed in the Reader Service Section.

New Control-Motor Line Offers Many Advantages

Compact and rugged, this new line of electric motors is designed for precision operation of final elements in automatic control systems. Typical applications include valves (rotary, slip-stem, butterfly), dampers, and louvers.

Units are reversing capacitor-type machines (Actionators), available in four basic models offering a variety of control techniques—on-off, two-position, floating, or proportional. Gear trains permit a choice of motor timings (7.5, 10, 15, 30, 60, or 120 sec.), and are readily accessible when end plate of gear housing is removed. Motor ratings: To 200 in.-lb., depending on speeds.

For positive control, internal brakes hold deadweight loads up to 200 lb. in any position, thus prevent coasting. Limit switches with field-adjustable cams vary travel from 10-

RAISED to dock height and tilted back-to-front, new body speeds loading operations.

DROPPED to sidewalk level, unit permits uninterrupted entry through its side doors.

TILTED front-to-back, body's rear now rests on the street for easy unloading through roll-up door.

Slashes Distribution Costs

chanism resembles a giant fork-lift truck, the body rails acting as forks.

Each rear wheel is mounted on a spindle which is attached to a lever. Latter's front end pivots about a stub connected to the body's understructure. Other end of lever incorporates a cantilever spring that engages a retractable pad when body is in driving position, some 30 in. from ground.

These spring pads, plus locking pins in channels behind cab, are retracted hydraulically when body is to be raised or lowered. As body drops, rear wheels, levers, and springs move upward into wheel housings in a motion similar to that of retractable aircraft landing gear.

All three cylinders are operated from a control panel at rear of truck. They may be actuated as a unit or independently, which permits tilting the body in any direction. As an added dividend, this system enables changing a rear tire simply by lowering the body unit until it rests on a block.

Demonstration unit shown above has a 16-ft. body, weighs 5 tons, and is rated for a 5-ton payload. A variety of body types with payloads up to 10 tons are available.

Railway Express Agency, which has ordered the first unit to be built, will test its potential advantages in moving seafood to and from New York City's Fulton Fish Market. The company expects to speed and simplify handling of live and iced fish in crates and barrels.

This service will take full advantage of the truck's adjustable body height, especially in traffic-congested area where short curbside parking spaces preclude use of the unit's rear door.

For handling foods, the body's conventional plywood lining will be eliminated to permit daily washing. And steel slatting will be used to protect interior walls from damage by heavy barrels.—*Thompson Trailer Corp., 2 Old Court Rd., Pikesville, Md.* Circle 152A on Reader Service Card

---

350 deg., and enclosed terminal compartments accommodate up to 16 terminals. Motors may be mounted in any position providing the shafts remain horizontal.

Units are about 6-in. dia., 10-in. long, and weigh 11 lb. They operate efficiently at temperature of 25-150 F., on common voltages and frequencies. — *Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia.*

Boiler Unit Saves Fuel, Curbs Soot and Smoke

Fuel savings of up to 25% plus a marked reduction in smoke and soot are advantages cited for a new boiler accessory.

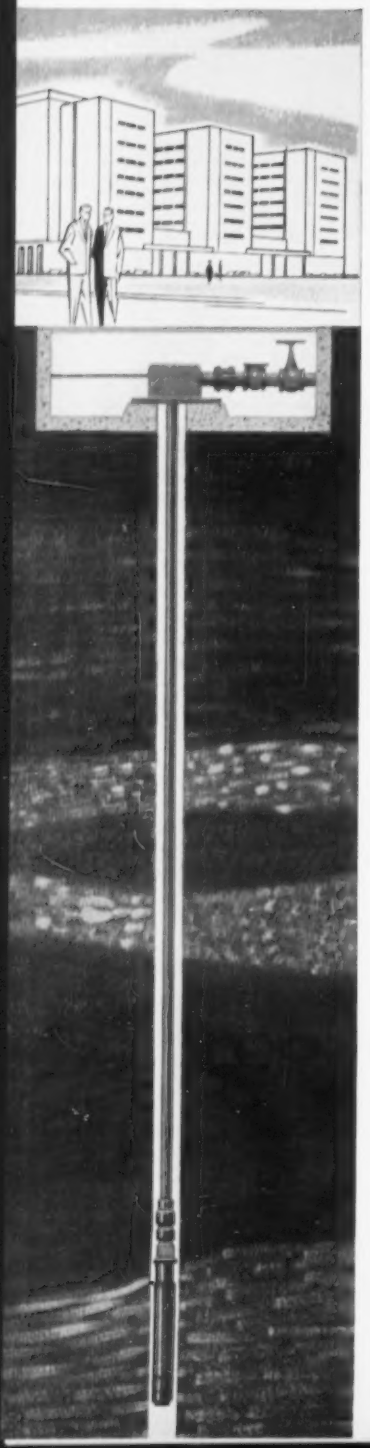
Known as Boston Air Preheater, it may be used with various types of boilers—low- or high-pressure; oil-, coal-, or coke-fired; and induced-forced-draft, or steam-blast.

In operation, secondary air is drawn through unit's intake by normal boiler updraft, is circulated through a labyrinth of hot surfaces, and delivered at about 400F.

High temperature of this air promotes combustion of heavy hydrocarbons that otherwise would settle out as soot or smoke. It also boosts heat-transfer rate, which is reflected in fuel savings.—*Preheater Corp. of America, 415 Lexington Ave., New York City.*

Circle 153A on Reader Service Card

Now you can bury your pumping problems



FAIRBANKS-MORSE
Water-Lubricated Submersible Pump

Now you can have all the advantages of a submersible pump, plus time- and performance-tested Fairbanks-Morse features.

Fairbanks-Morse submersible pumps permit well location anywhere that a well can be drilled. No unsightly installations, no costly pump housing. Nothing—absolutely nothing—need show above ground. These pumps submerged in the well below water level are practically soundless and require no line shafts, packing boxes or lubrication devices. Hence, wearing parts needing maintenance are reduced to a minimum. A single moving assembly does all the work.

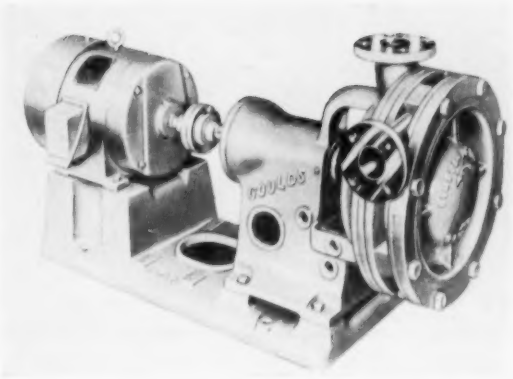
Installation is faster and more economical. The Fairbanks-Morse motor, with lifetime Copperspun rotor cooled by water and lubricated by water, gives full motor output. The well-known Fairbanks-Morse or Pomona pump bowls are combined with these wet stator motors to produce unbeatable pumping units covering a wide range of requirements as to volume, pressure, and setting depth.

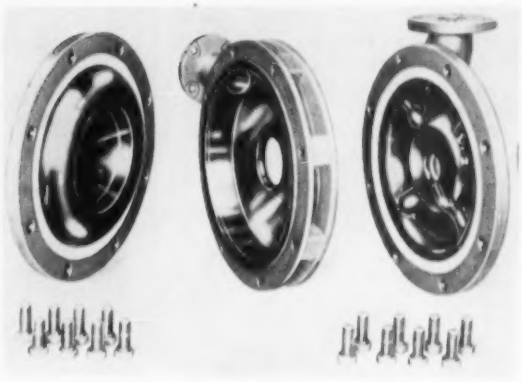
For industry or community service you can place your water service trust in the F-M submersible. Contact your Fairbanks-Morse Sales Engineer and ask him for Bulletin 6910 on this time-proved submersible pump, or write today to Fairbanks, Morse & Co., Dept. FE-8, 600 S. Michigan Avenue, Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY
RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS





Glassed Centrifugal Pump Eliminates Corrosion, Product Contamination

Glassed metal, only recently perfected for pump application, is now being used for all interior parts of a radically new line of centrifugal pumps.

Available in capacities to 700 gpm. and for heads to 140 ft. (depending on capacity), these units offer four significant advantages:

1. **Maximum corrosion resistance.**
2. **Curbing of metallic contamination.**
3. **Installation flexibility.**
4. **Ease of cleaning and maintenance.**

The glass, chemically bonded to cast iron at fusion temperature, resists all organic and inorganic acids (except hydrofluoric), also alkalis up to pH 12 at 212F. Thus, the pump may readily be switched from one product to another without concern for corrosion. This, in turn, minimizes changeover time and eliminates the need for stocking different units for specific products.

Furthermore, glass surfaces prevent any contact of product with metal, which curbs contamination and catalytic effect. Latter is particularly important with items susceptible to metal-catalyzed oxidation or darkening.

Pump's special three-piece construction (right photo) provides for flexible installation. The casing, suction piece, and casing cover are individual parts that may be separated by removing bolts. Suction piece may be installed in any of three positions—top vertical, or 90-deg. either side of vertical. Discharge outlet can be placed in four positions.

Cleaning and maintenance are facilitated by the pump's special design, absence of sharp corners and internal joints, and the tendency of glass to minimize product adherence. Casing assembly, which is sealed with Teflon gaskets, permits inspection and maintenance without breaking suction or discharge piping.

Pump impeller is of the semi-open type, statically and hydraulically balanced, and glassed on all product-contact surfaces. It screws on the shaft with right-hand threads and is locked with a fiber insert. Depending upon size, impeller can handle solids ranging $\frac{5}{8}$-$\frac{3}{4}$ in.

Because the pump is completely sealed, it is suitable both for outdoor installations and for locations where units are hosed down.—*Goulds Pumps, Inc., 29 Black Brook Rd., Seneca Falls, N. Y.*

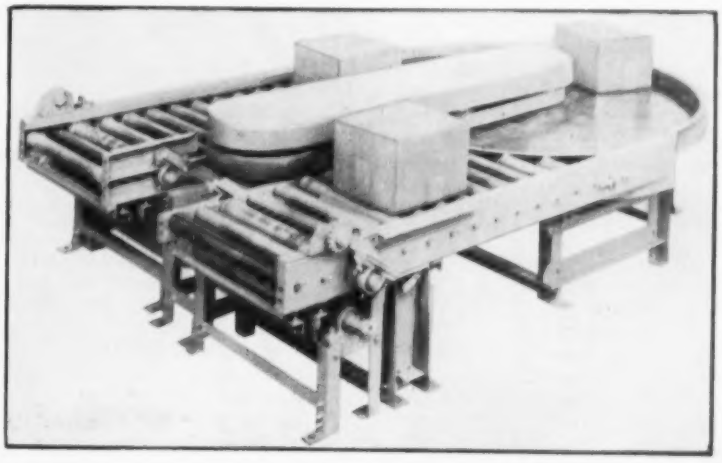
Circle 155A on Reader Service Card

180-Deg. Conveyor Turntable Takes 25% Less Space

Here's a new conveyor turntable designed to take cartons through a 180-deg. turn in 25% less space, thus is particularly suited in narrow areas or where space is at a premium.

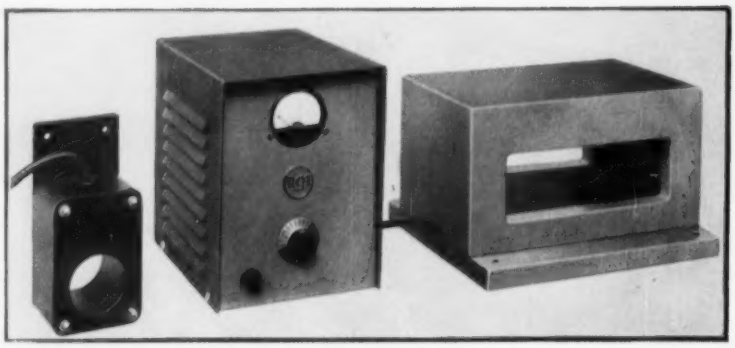
For use in either live-roller or powered-belt systems, unit (A-F) employs an endless traveling inner guide belt for correct tracking of cartons throughout the turn, and proper discharge to receiving conveyor. A beveled edge on the turntable facilitates transfer from conveyor to rotating table.

Equipment is driven by spur



gears and a variable-speed motor. Latter also powers the guide belt. Proper belt tension is maintained by an automatic takeup, and all moving parts of the unit are covered with guards to protect against accidents.—*Alvey-Ferguson Co., 1527 Disney St., Cincinnati.*

Circle 155B on Reader Service Card



Conveyor-Line Metal Detector Guards Food Quality

Highly sensitive and completely automatic, this electronic metal detector eliminates the human element from the inspection process.

In most conveyor-line installations, unit (RCA) is used in a semi-automatic operation in which rejected packages are removed manually. However, it can easily be synchronized with an automatic deflection arm.

In operation, product passing through an inspection aperture is subjected to a high-frequency electromagnetic field. Presence of metallic particles causes a reaction in the field, which can actuate a signaling device or automatic-rejection equipment.

Unit may also be used for inspecting bulk material on a conveyor, or piped fluids which are passed through the detector by means of non-conductive tubing.—*Radio Corporation of America, Camden, N. J.*

Circle 156B on Reader Service Card

Unit Guides Processing Of Cheese Curd

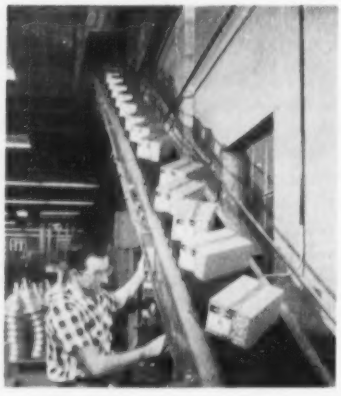
By accurately measuring the firmness of cheese curd particles during "cooking", this instrument readily enables the operator to determine proper time and temperature of cook for maximum product uniformity.

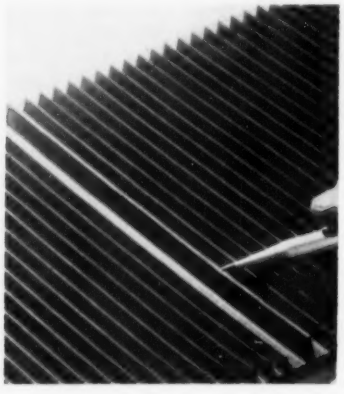
Thus, it permits greater yields with less danger of shrinkage from overcooking, and crumbling through undercooking.

Unit (Lundstedt Cheese Curd Meter) consists of a barrel, a calibrated plunger, and a perforated basket. It is mounted with top of barrel at eye level. As curd approaches the finishing point, operator dips out a prescribed amount and, after washing and cooling it, places it in the basket.

Plunger is then released and falls into basket. Weight of the plunger forces particles out of the basket in exact proportion to curd firmness. Depth of penetration is then read from the calibrated handle.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago.*

Circle 156A on Reader Service Card





Package-Conveyor Belt Has Firm Gripping Action

Especially designed for steep-angle conveying, this new ribbed belt reportedly will carry lightweight packages as firmly as heavy cartons.

Unit (Griptite) employs a series of inverted V-shaped ribs that grip cartons in both incline and decline operations. Extra protection for very light packages is provided by raised ribs or cleats (also inverted V-shaped) spaced 18 in. apart. Belt may be operated at angles up to 45 deg., depending on weight, size, and surface of package carried, and conveying equipment.

Ribs are of tough, flexible rubber. Carcass is a special lightweight fabric providing thin flexible construction especially suited for small pulleys. Standard ribs are ¼-in. high and spaced four per inch. Raised ribs (shown in right photo), which are

the High note of Quality is Griffith's!

A BEAUTIFUL BUILD-UP

Grffith's KRUSTO Batter and Breading Mixes are gaining preference—for better adhesion, higher pick-up and lasting crispness. Advise product you produce, how cooked, and degree of golden-brown color wanted. There's a KRUSTO Mix to match your specifications.

Why so Consarned Particular?

Griffith's PEPPEROYAL (R) and Solublized Seasonings are formulated for particular food processors. Start with Griffith's own spice extractives, processed to a higher standard of flavor. Always uniform, to assure better and predictable flavor quality — as sterile as only soluble seasonings can be! Packed airtight in unit or batch-size bags with cellophane liners. (REGAL brand contains Griffith's Sodium Ascorbate, for fast and longer lasting cured color in Corned Beef and Sausage Meats.)

"I Used to Get Pickled-

But Now I'm Cured!"

PRAGUE POWDER (R) is famous for developing maximum color and flavor in safest minimum time. There's only one PRAGUE POWDER — balanced ingredients *fused as one* in fast-dissolving crystals. For all pork, beef, and poultry curing . . . made or for use under U. S. Pat. Nos. 2,668,770-2,668,771-2,770 548-2,770,549-2,770,550 and 2,770,551.

"NO TASTE" . . . "HEAP BIG TASTE!"

You can't buy better MSG, the tasteless white crystals that stimulate flavor buds — make everything else taste so much better! *AND GRIFFITH'S VEGAMINE:* Here's a complete hydrolized protein with full, rich meaty flavor —a pleasing plus in quality foods.

"So Round, So Firm, So Fully . . ."

Griffith's Fine Golden Cereal Binder, and Grade A Pep, both top-quality binders for wieners and other sausage meats. Each helps in retention of moisture and emulsification of fats. Quality control includes Sterilization treatment. Then, take KRUSTO "S" with that home-baked flavor of crumb-loaf for meat loaves. Fat-free, it is exceptional in binding action. And Griffith's KRAKR FLOUR F-89 . . . another product purified by Sterilization treatment is formulated for frozen cream sauces, soups and gravies.

TAMES WOULD-BE TOUGH

Any of Griffith's successful Seasoning and Tenderizer formulas will make tough beef tender. All are produced and tested for instant tenderizing action in high-speed production. Perform two functions instantaneously in the dip: (1) Upgrades tender quality of low-grade carcasses, and (2) Enhances the flavor quality of such cuts.

THE GRIFFITH LABORATORIES, INC.

CHICAGO 9, 1415 W. 37th St. - NEWARK 12, 37 Empire St. - LOS ANGELES 58, 4900 Gifford Ave.

Griffith's

from spices and snuff to chemicals and powdered milk

Model HG-84 Automatic Filler
Up to 60 units a minute

S&S Automatic fillers

cut packaging costs of "hard-to-handle" products!

If your product is a sticky or dusty powder, hard-to-handle flakes or granules . . . if you package in cans, jars, boxes or cartons . . . if you want filling accuracy of plus or minus 1% for most products . . . then you can reduce your packaging costs with the versatile Stokes & Smith line of automatic high speed fillers.

Three different filling methods are available, depending on the characteristics of your product . . . volumetric set-time, gross weighing or combination auger-vacuum. Each method delivers accurate fill automatically through a controlled auger feed. Changeover from one product or package size to another is quick and simple. Container size ranges from 1½" to 6" wide, 1½" to 4" thick, 1½" to 8" high.

Multiple-station tandem fillers are also available for speeds of up to 145 units per minute. All models require only one attendant to feed.

A few of the many companies who have purchased S&S high speed automatic fillers

American Stores Company
Avon Products, Inc.
The Borden Company
Coty, Inc.
E. I. duPont
Durkee Famous Foods, Inc.
Albert Ehlers, Inc.
R. T. French, Inc.
The Fyr-Fyter Company
General Foods Corporation
Johnson & Johnson, Inc.
Lederle Laboratories Div.
J. Martinson & Company
Wm. Montgomery Company
Pet Milk Company
Rexall Drug Company
Stanley Home Products
U. S. Tobacco Company
White House Milk Company

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For complete specifications and details, write to:

FMC PACKAGING MACHINERY DIVISION

Stokes and Smith Company

4914-G SUMMERDALE AVE.
PHILADELPHIA 24, PA.

← For more data, circle this page number on card at back

⅜ in. high, also help move packages onto the belt.

Since there are no rough surfaces to accumulate dust or dirt, unit has self-cleaning action. As belt travels around pulleys, ribs fan out and release any spillage.—*B. F. Goodrich Industrial Products Co., Akron, Ohio.*

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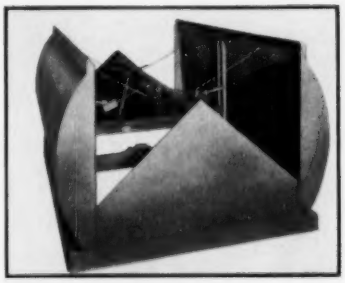


Relief-Type Roof Vent Aids Fire Fighting

This quick-opening vent, designed for rapid escape of smoke, heat, and gases in event of fire, provides a 28 sq. ft. opening.

Known as Pyrojector, it operates entirely above the roof line. At temperatures above 212F., a fusible link melts and coil springs open two double-wall dampers outwardly. This relief limits the horizontal spread of flame and makes fire fighting more effective by revealing its location.

Unit is weatherproof when closed and can be used for extra ventilation in good weather.—*The Swartwout Co., 18511 Euclid Ave., Cleveland.*

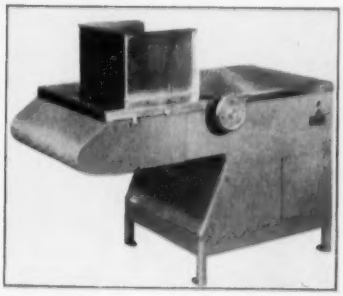
Circle 159A on Reader Service Card

Seals Cold-Storage Doors Against Moisture

Shown here is a new sealing technique for cold-storage doors that promises trouble-free operation at temperatures down to −80 F. It prevents moisture penetration into the core when door is under high vapor-pressure conditions.

Known as Vap-r-tyt, method consists of soldering all metal seams and sealing all penetrating bolts on front of metal-clad doors, whether cladding covers entire door or only part of it. This protection is now standard on all of maker's low-temperature doors for zero and sub-zero operation, and is optionally available on any other metal-clad door in the line.—*Jamison Cold Storage Door Co., Hagerstown, Md.*

Circle 159B on Reader Service Card



Higher Power Reported For Frozen-Food Cutter

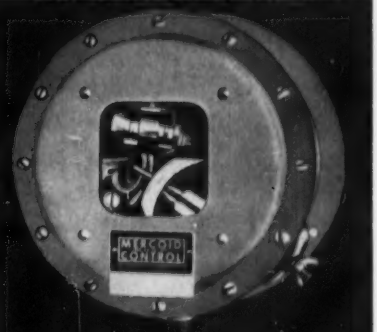
Redesign of this hydraulic frozen-food cutter has more than doubled its power—thus it now easily cuts a 6x4 in. block of hard maple (photo above) at less than 1,000 lb. pressure.

This power increase is attributed to use of 2½-in.-dia. cylinders that provide cutting pressure of 6,848 lb. per cylinder. Unit's hopper is adjustable from 4 in. minimum to 9 in. maximum, and cutting speed ranges 20-22 strokes per min.

Special hydraulic design and a limit-switch arrangement enable synchronizing the stroke with a timed

MERCOID®
WEATHER RESISTANT
CONTROLS

VISIBLE
CALIBRATED DIAL
ON-OFF SWITCH POSITION
OPERATING POINT INDICATORS



for pressure or temperature

HERMETICALLY SEALED CONTACT
ZINC PLATED STEEL CASE
OUTSIDE ADJUSTMENTS

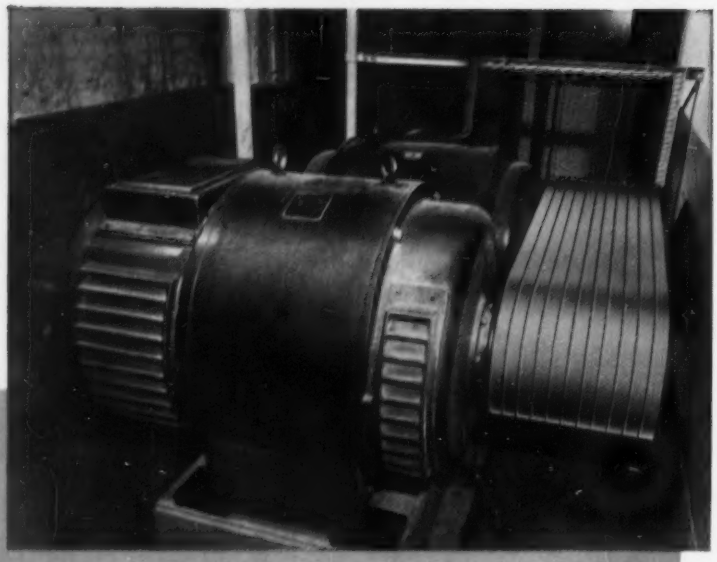
FOR OUTDOOR SERVICE
OR OTHER APPLICATIONS
(NEMA 1A, 2, 3, 4)

Drip Tight
Semi-Dust Tight
Weather Resistant
(Weather Proof)
(Splash Proof)
(Sleet Proof)
(Moisture Resistant)
(Rain Tight)
Weather Tight
(Hose Test)

Write for catalog No. 857W which also lists general purpose controls (NEMA 1) and explosion proof controls (NEMA 7, 9, 9A).

THE MERCOID CORPORATION
4201 Belmont Ave., Chicago 41, Ill.

For more data, circle this page number on card at back →



How CONCAVE SIDES cut V-belt costs

By this simple test you can see for yourself how the concave sides (Fig. 1) of the Gates V-Belt lengthen the life of the belt... *thus reducing costs.*

Just bend a Gates V-Belt and feel the sides. You will see that these precisely engineered concave sides have now *become straight*, permitting them to grip the sheave groove evenly. (Fig. 1-A). This assures longer belt life; lower costs.

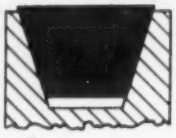


Fig. 2-A

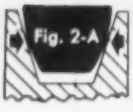


Fig. 2

Now make the same test with a straight-sided belt. (Fig. 2) Notice how the sides bulge out on the bend (Fig. 2-A) concentrating the wear at the points shown at arrows.

These tests should convince you that it *pays* to specify the V-Belt with Concave sides—Gates Vulco Rope...readily available from nearby distributors.

THE CONCAVE SIDE
U.S. PAT. NO. 1813698

TPA 199

Gates Distributors are in the Yellow Pages

World's Largest Maker of V-Belts

The Gates Rubber Co.
Denver, Colorado

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the U. S. and Canada, and in 70 other countries throughout the world.

Gates VULCO ROPE Drives

Equipment & Supplies

take-away conveyor. Also, unit can be pre-set for either of two stroke lengths by means of a selector switch.

There are two thickness gage plates, one for ¾-in. and ½-in. slices, the other for a 6-in. slice. They are of stainless as are the knives and carriages. In addition, machine has special finish that guards against corrosion and chipping.—*H. G. Weber & Co., Kiel, Wis.*

Circle 159C on Reader Service Card

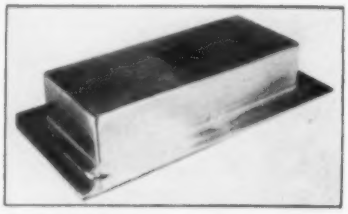
Novel Moisture Tester Has Built-In Memory

This automatic unit not only minimizes the time required for gravimetric moisture determinations, but stores the results indefinitely.

Now all a lab technician has to do is weigh a sample directly into the machine's sensitive pan balance, push a button, and the unit takes over.

In 6 min., it dries the sample, reweighs it, computes moisture content to ±0.2%, rings a bell, and waits to be read.—*C. W. Brabender Instruments, Inc., P.O. Box 106, S. Hackensack, N. J.*

Circle 160A on Reader Service Card



Sanitary Plate Magnets Guard Product Quality

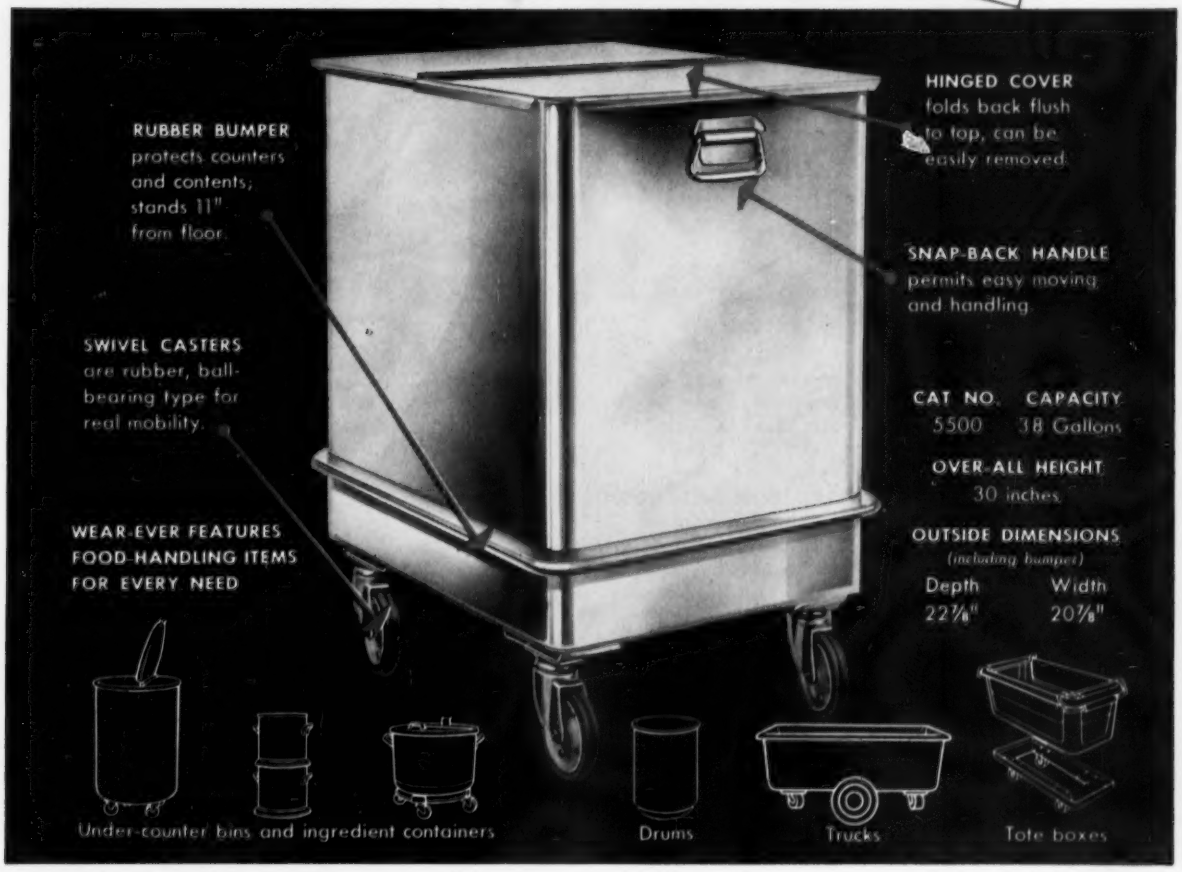
This sanitary magnetic separator removes tramp iron from any product (wet or dry) that is handled by belt, screw, or chute. Typical applications include guarding the quality

33-1/3% more capacity . . . 24" and 30" heights

in this new rectangular, mobile under-counter type

BIN

by WEAR·EVER



We've "squared away" the conventional round container, to give you ⅓ *more* carrying and storing capacity, *in comparable over-all size.* Think what this can mean to you in faster handling, fewer refills, greater utility.

Quality's the same, of course, as in all Wear-Ever Aluminum food handling items. Extra hard-wrought dent and scratch resistant alloy. Seamless construction. Smoothly rounded, easy-to-clean inside corners. Sanitary flared rim.

Naturally, we've designed this new container for a perfect fit under your standard cook's and baker's work tables —same as the round type.

Like to see a sample? Pick up the phone and ask your Wear-Ever man to wheel one over. Or send coupon for full details on our complete food handling line.

WEAR·EVER ALUMINUM UTENSILS

THE ALUMINUM COOKING UTENSIL COMPANY, INC.
WEAR-EVER BLDG., NEW KENSINGTON, PENNSYLVANIA

The Aluminum Cooking Utensil Company, Inc.
308 Wear-Ever Bldg., New Kensington, Pa.

GENTLEMEN: *I'd like to know more about your new rectangular under-counter bin.*

☐ Send me your catalog. ☐ Have your representative see me.

NAME .....

TITLE .....

Fill in, clip to your letterhead and mail today.

NEW ITEM! *Wear-Ever's new Metal Scouring Cloth. Won't scratch, won't mar, far outlasts ordinary scouring cloths. At your dealer's.*

uniformly fine flavor

Don't give normal seasonal or regional variations in flavor a second thought when you use MSG (pure mono sodium glutamate) in food processing and preparation.

MSG controls the over-all flavor features of quality protein foods. By blending and strengthening their naturally fresh taste MSG can create a uniform flavor identity the consumer recognizes. It is economical and easy to use.

Always rely on Great Western MSG to accentuate and maintain the fine fresh flavor characteristics of your product. Insure *uniform flavor-quality* to develop dependable customer brand preference.

Discover **"The Secret of Good Taste"** *— Try Great Western's*

GREAT WESTERN
MSG
99+% Pure Mono Sodium Glutamate Crystals

in: vegetables, meats, canned soups, poultry, seafood, sauces, gravies, seasonings, and frozen foods.

A Product of
AMERICAN AGRICULTURE

We invite inquiries from current and prospective users of MSG

THE GREAT WESTERN SUGAR COMPANY
Denver, Colorado

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of vegetables, soup stock, meat products, and pickles.

Non-electric units (Cesco Sanitary Magnetic Plates), they are made of stainless steel, welded at every joint, and polished to a satin finish. Free of cracks, crevices, and sharp corners (which might promote unsanitary conditions), plates are waterproof and may be washed regularly along with other equipment.

Units are powered by strong Alnico magnets. Preferably, product should pass over the plate in as thin a layer as possible, but the separator may also be suspended over the material. Four models of varying power are available in any width from 4-48 in.—*Columbia Engineering Service, Santa Rosa, Calif.*

Circle 160B on Reader Service Card

candles. In comparison, levels of 100-200 footcandles have until now been considered well above average.

Unit (Power-Groove), shown opened in top photo, has a series of lengthwise grooves that double the light output through effective control of electrons and mercury pressure within the tube. Use of a 400-cycle circuit cuts ballast weight about 20 lb. per fixture and reduces heat transfer into the room.

Louvers are wedge-shaped in cross section (bottom photo), with each side approximately parabolic. Fixture's 35-deg. shielding, both for cross and lengthwise viewing, boosts employee comfort.—*General Electric Co., Nela Park, Cleveland.*

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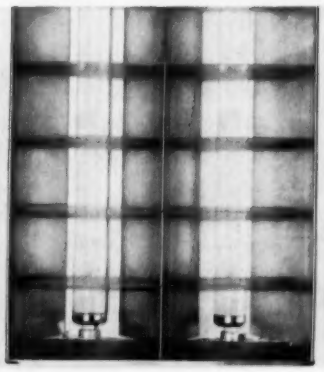
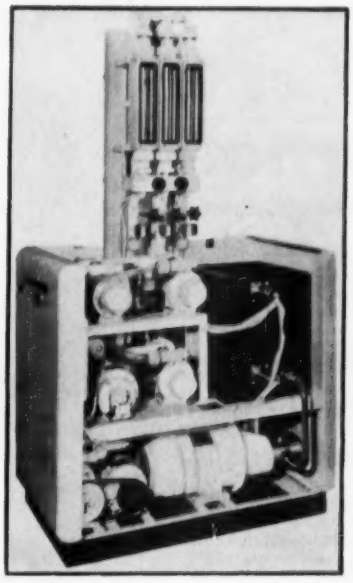


Unique Fluorescents Provide 1,000 Footcandles

Radically new fluorescent lamps, operating at high frequency in a special fixture, reportedly give the highest level of comfortable lighting yet achieved—over 1,000 foot-



New Ultrasonic Emulsifier Has Many Applications

Employing a new operating principle, this ultrasonic emulsifier offers faster and more complete emulsification, plus easier maintenance. Typical applications include processing of salad dressings, margarine, soups, sauces, ice cream, and peanut butter.

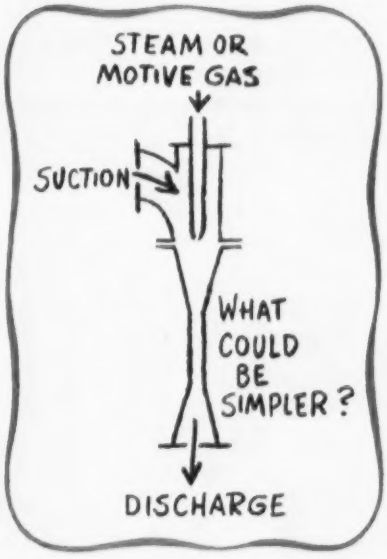
Unit uses fluid-dynamic forces of the liquid to produce the sound waves, instead of generating ultrasonic energy externally. This is accomplished by impinging fluids in a jet stream on the edge of a blade. Latter vibrates at its natural frequency (about 22,000 cps.), and cavitation occurs continuously in

how to move

GASES

with

NO MOVING PARTS



In I-R Ejectors, nothing moves but the motive and suction gases

AS SIMPLE and sturdy as a piece of pipe, the I-R Ejector offers real *economy* and *dependability* for a wide range of applications.

They can be used to create vacuum or increase pressure, and to mix gases.

Your nearest Ingersoll-Rand branch office or representative will be glad to give you complete information.—Or write today for a copy of Bulletin 9013-A.

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11 Broadway, New York 4, N. Y.

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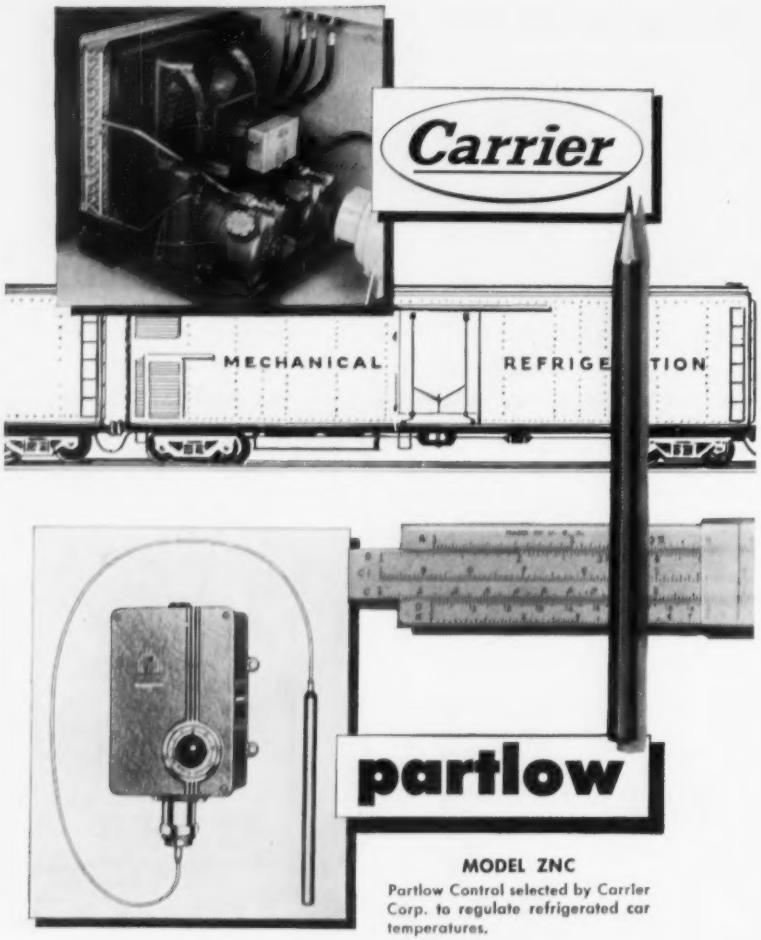

MODEL ZNC
Partlow Control selected by Carrier Corp. to regulate refrigerated car temperatures.

Partlow Controls help Carrier Railway Refrigeration Units "think for themselves"

Carrier Railway Refrigeration Units that "think for themselves" are setting a new standard for positive, controlled temperature in rail transportation of frozen foods. *And Partlow Controls call the signals that keep temperatures on the button!*

The Carrier systems are designed to heat as well as cool, providing a constant temperature despite the various climate changes encountered in transcontinental runs. A car temperature range from –10°F to 70°F is possible, depending on the Partlow Control setting.

What's your temperature control problem? Tell it to Partlow! There's a Partlow Control to fit your requirements . . . in the range from –30°F to 1200°F. For use with gas, oil, steam or water valves; or electrical equipment.

SEND FOR CONDENSED CATALOG

partlow

the pioneer in mercury thermal controls

THE PARTLOW CORPORATION, Dept. F-857, New Hartford, N.Y.
Offices in All Principal Cities

NO MATTER WHAT YOU MAKE, PARTLOW CONTROLS WILL HELP MAKE IT BETTER

the stream rushing past the blade. All energy is developed and used right in the product.

Illustrated machine (Autosonic) reportedly meets the need for a continuous supply of emulsion automatically geared to process volume. Oil, water, and emulsificant enter through three valves and flow-rate indicators, which adjust proportions of each ingredient in final emulsion. Float switches maintain proper balance in a reservoir by starting and stopping feed and discharge pumps, as well as the emulsifying unit. Capacity range is 100-250 gph.

Another unit (Dispersonic) is designed to handle dispersions of powders in liquids or emulsions of an abrasive nature. A 3-hp. motor provides a continuous output of 300 gph. Mounted endwise on legs, off the floor, it is easily set into place and moved as required.

All parts of these machines are readily accessible for cleaning. Those in contact with liquids are of stainless steel or are plastic coated.—*Sonic Engineering Corporation, 146 Selleck St., Stamford, Conn.*

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INGREDIENTS

Spray-Dry Citrus Flavors Boost Product Quality

Developed particularly for use in gelatin dessert powders are three new spray-dried citrus flavors.

Known as "Dolcoseal", they are specially processed from natural oils (lemon, orange, and lime) for maximum stability. Used at the rate of 4 oz. per 100 lb. of dessert powder, they impart excellent flavor to the clear finished product.—*Dodge & Olcott, Inc., 180 Varick St., New York City.*

Circle 164A on Reader Service Card

2 New Synthetics Gaged For Possible Food Use

Preliminary toxicological studies on two new products have indicated their possible suitability for use in foods and food-packaging materials.

First material is a new form of hydroxypropylglycerine (Hyprin GP 25), made by reaction of glycerine and propylene oxide. It is a viscous, amber liquid, less volatile and hygros-

The New Way to DISPERSE, EMULSIFY and BLEND

Particle Control with a GAULIN Homogenizer

What's the best method to disperse, emulsify or blend? It's all in Particle Control. No single piece of equipment will satisfy all requirements, so Gaulin offers three designs.

HOMOGENIZER works at high pressures, uses tremendous velocity and energy gradients to create extreme concentrated turbulence to produce more uniform, stable emulsions and dispersions.

SUB-MICRON DISPERSER handles pigments and other abrasive dispersions. S-M-D Valve uses the same hydrokinetic principles as Homogenizer to produce dispersions of ultimate fineness.

RE* COLLOID MILL is a highly advanced, two-stage design which provides continuous micrometer control for producing superior emulsions or dispersions. Operation is greatly simplified, maintenance negligible.

LABORATORY HOMOGENIZERS AND COLLOID MILLS are available on rental basis. Use them to explore the dramatic new Gaulin dimension of Particle Control.

PARTICLE CONTROL plus GTA — Gaulin Technical Assistance — is the key to new savings, better quality in your processing.

For complete data on the new RE* Colloid Mill — Ask for Bulletin C-57

Find out about all the things you can do with a Laboratory Homogenizer — Ask for Bulletin LH-55.

For technical data on Homogenizers and Sub-Micron Dispersers — Ask for Bulletins H-55 and SMD-55.

Manton-Gaulin offers complete research, laboratory and test facilities, plus 60 years' experience, to help you apply Particle Control for dispersions, emulsions and blends.

FREE! Ask for GTA and the Gaulin Library of Product Information . . . your best source for a low-cost solution to moving or mixing your product. Write or call today.

Gaulin

MANTON Gaulin

MANUFACTURING CO., INC. EVERETT, MASS.

MANTON-GAULIN MANUFACTURING COMPANY
73 Garden St., Everett 49, Mass.

Aluminum Foil Packaging– Resistance to Insect Infestation

Report No. 10 of a Series by Reynolds Metals Company

Insect infestation of packaged foods and other products is important from the standpoint of health and sanitation as well as economics. And products, even though free of insects when packaged, may become infested by insects penetrating the package material itself.

Food manufacturers and processors are vitally concerned with the insect resistance of packaging materials. Consumers, too, have a stake in this—and so do wholesalers and market operators who can boost profits by purchasing in larger quantities. The risk is big, however, because of the difficulty and expense of insect control. Regardless of storage care, packaged foods pass through so many channels that contact with a wide variety of insects is inevitable.

The ability of insects to penetrate packages varies. It depends on the species of insect and its stage in life, the presence of folds, creases or scratches on the outside surface of the package, and particularly upon the type and thickness of the packaging material.

Among all materials, aluminum foil is outstanding in its ability to resist penetration by insects. This is in addition to its well known superiority in maintaining freshness and flavor by excluding moisture, air, odors and light.

Aluminum foil has several properties that make it an excellent insect barrier. It is hard, making it difficult for most species to bore through. It is odorless, tasteless and has no food value to attract insects. It is opaque and insects appear to prefer transparent materials. Since hunger or the desire for seclusion is the driving force that causes insects to bore through packaging materials, they are selective in their attacks. Most plastic and organic packaging materials absorb or allow the escape of food odors that insects can detect. In many instances, these materials themselves have characteristic odors or tastes that attract insects. Aluminum foil is non-absorptive and practically impermeable, making it an ideal component for insect-resistant packages.

Studies with various insects, particularly the cadelle and the lesser grain borer (both extremely good borers), have shown that they will penetrate 80% to 85% of packages made from widely used plastic films within two or three weeks' time. Proper use of 0.001" aluminum foil cuts this penetration to zero over a one month test period.

Greatest attention to this insect problem is being given to consumer packages—generally sealed overwraps, carton liners or pouches. But bulk storage of products for future use or processing presents an even greater problem. The solution is provided by the large variety of aluminum foil materials and packages available for bulk storage. These include multiwall bags with aluminum foil liners, case liners of aluminum foil, foil-lined fiber drums, and aluminum foil for lining storage bins. Use of aluminum foil for lining storage bins also permits effective fumigation to prevent reinfestation without contaminating the products stored.

The accompanying table gives the results of a controlled one-year test of insect infestation in a bulk storage situation.

Reynolds research facilities and experience are available to help solve your packaging problems. Call your nearest Reynolds representative. Or write **Reynolds Metals Company,** General Sales Office, Louisville 1, Ky.

EFFECTIVENESS OF ALUMINUM FOIL IN COMBATING INSECT INFESTATION

STORED PRODUCT
Tobacco, 1000-lb. lots

INFESTING INSECTS
Tobacco Beetle and Moth

DURATION OF TEST
One Year

CONTAINERS TESTED
Unlined Hogsheads and Hogsheads lined with laminated aluminum foil material (.0015" heat-sealing plastic film .001" aluminum foil 80-lb. paper)

RESULTS OF TEST

UNLINED HOGSHEADS
All were infested to a depth of 10 to 11 inches. Resulting tobacco loss was as high as 6%.

LINED HOGSHEADS
Infestation was confined to two small surface areas where lining material had been punctured. Penetration zero. Loss zero.

See "Circus Boy", Sundays, NBC-TV. Watch for Reynolds on "Disneyland", ABC-TV Network.

©Reynolds Metals Company, Louisville 1, Kentucky

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copic than the original glycerine.

Second item is a plasticizer and surface-active-agent intermediate (Hyprose SP 80) made by reacting propylene oxide with sucrose. It, too, is a viscous, amber liquid. Fatty-acid esters of this material show promise as emulsifiers and detergents. —*Dow Chemical Co., Midland, Mich.*

Circle 164B on Reader Service Card

Isoascorbic Acid Offered As Easy-to-Use Tablets

D-isoascorbic acid, which safeguards color of cured meat products, is now available in easy-to-use tablet form.

Tablets (Takatabs) are made effervescent for rapid dissolving, forming sodium isoascorbate in solution. They may be added directly to pumping and cover pickles without danger of releasing toxic nitric oxide fumes. In addition this agent can be applied as a spray.

Product is packaged 100 tablets per box. Two tablets provide $\frac{7}{8}$ oz. of sodium isoascorbate, which is the maximum level permitted per 100 lb. of meat.—*Takamine Laboratory, Clifton, N. J.*

Circle 167A on Reader Service Card

CHEMICALS

New Cleaner Curbs Foam In Spray-Wash Units

Excessive foaming of bake-pan cleaners in spray washing machines may now be eliminated with use of a new high-efficiency compound.

Called "PMMC," its foam-controlling ingredients also emulsify contaminants that tend to clog pipes and spray jets. Thus, labor and maintenance costs are cut. Material retains alkalinity over long periods, is free-rinsing and non-corrosive.—*Diversey Corp., 1820 W. Roscoe St., Chicago.*

Circle 167B on Reader Service Card

Potent Deodorizer Gives Low-Cost Control

Unpleasant odors in slaughter houses and rendering plants, for example, may now be economically controlled by a new water-soluble deodorizer.

Product (Ozene) not only masks existing odors but also attacks odor-causing organisms, thus can be fed directly into sewage lines. Easily used as a spray or in water solution, material is fast-acting and may be diluted as much as 100:1.

Furthermore, it cuts slime and grease deposits.—*Allied Chemical & Dye Corp., Solvay Process Div., 61 Broadway, New York City.*

Circle 167C on Reader Service Card

BRIEFS . . .

Automated System of warehouse distribution employs electronic controls that guide flow of goods through every phase of operation. Punch cards provide automatic inventory control and billing.—*Dasol Corp., 14 Charlton St., New York City.* (167D)

Stainless Liquid Meter, with only one moving element exposed to fluid, offers accurate control and maximum product protection. Capacity of 1½-in. unit (Neptune) ranges 20-100 gpm. for most liquids. —*Neptune Meter Co., 19 W. 50th St., New York City.* (167E)

Portable Grain Conveyor cleans, conveys, and conditions product in one operation. Unit (Grainvayor) employs automatic vacuum-con-

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EFFECTIVE LUBRICATION in spite of moisture

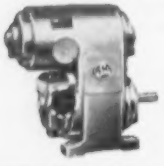
LUBRIPLATE 130-AA

affords machine parts and bearings real protection against rust and corrosion. It is a grease type lubricant that possesses the utmost in water and acid resistance. It has exceedingly high film strength. Due to the marked adhesiveness and water resistance of LUBRIPLATE 130-AA, it does not wash off readily, hence is the ideal lubricant in the presence of moisture.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.

STERLING SPEED-TROL VARIABLE SPEED MOTORS



STERLING SLO-SPEED GEAR MOTORS

STERLING CONSTANT NORMAL SPEED MOTORS

STERLING MULTI-MOUNT SPEED REDUCERS

Let Sterling Electric Power Drive Engineers assist you in the selection of power transmission equipment and controls precisely co-ordinated with your machinery, product and production volume to help you achieve greater productivity. Sterling Drives correctly matched to specific job requirements can simplify cost reduction and improve your competitive position. Thousands of leading companies are profiting daily through installation of correctly engineered Sterling Electric Power Drive systems.

Write for Bulletin No. 185. Discover the big advantages Sterling Electric Power Drives can bring to your plant.

Sterling offers you a wide range of Electric Power Drives of advanced design—variable speed or constant speed—with manual or automatic controls.

STERLING ELECTRIC MOTORS

Los Angeles 22 • Chicago 35 • Cincinnati 37 • New York 51

Equipment & Supplies

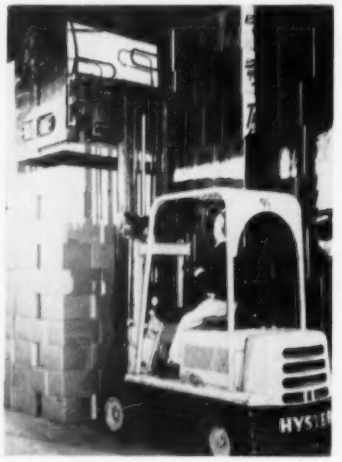
trolled cleaner that removes contamination and reduces musty odors. Operated by one man, machine will convey over 400 ft., elevate to about 100 ft.—*Myers-Sherman Co., Streator, Ill.* (167F)

Remote Humidity Indicator provides continuous readings accurate to 1½%. Mechanically-operated device (6-5/8x6x4¼ in.) is easily installed, weighs 9 lb.—*Serdex, Inc., 91 Cambridge St., Boston.* (168A)

Stainless Milk Tanker, having arch-type construction with 'drop belly', provides 2,850-gal. payload. Unit (Light Flight) has low center of gravity that eliminates side sway and offers improved tracking and braking, whether tank is full or empty.—*Stainless, Inc., 15048 Delano St., Van Nuys, Calif.* (168B)

New Dial Thermometer (3½ in.) fits all bi-metallic wells. Stem can be placed at any angle and case rotated to any position without affecting accuracy. Unit (Model 1035) has ¼-in.-dia. bulb, ½-in. N.P.T. fitting. —*Palmer Thermometers, Inc., 2502 Norwood Ave., Cincinnati.* (168C)

EQUIPMENT APPLICATIONS



Pallet-Less Unit Handling Cuts Costs for P&G

A new system of handling unit loads without pallets has proved a real cost-cutter in Proctor & Gamble

← For more data, circle this page number on card at back

ERIEZ PRESENTS THE FEEDER YOU HELPED DESIGN!

Before Eriez engineers designed this new vibratory unit, they went *right to the people who use feeders* and asked them to list the features they'd want in a feeder. The result is this outstanding vibratory feeder—the most efficient, most dependable unit that engineering skill has yet produced—a feeder based on new concepts in mechanical design and construction materials.

Accurate, controlled feed of bulk materials from ounces to tons per hour—*automatically!*

For all types of materials

Dry, hot, dusty, lumpy, abrasive, etc. Conveys, spreads, agitates, separates, blends, dries, cools and mixes bulk materials economically and in little space. New, rectangular-shaped tray produces uniform feed without "front end flip" or rear "dead spots." Compact base; feeders can be used in tandem or side-by-side applications. Has firm, stable mounting . . . or can be mounted without the base, directly on a component.

HI-VI's operating principle; no rectifier needed!

Operating at 3600 CPM directly off an AC line, this new feeder needs no rectifier; just plug or wire it in.

The heart of the Eriez HI-VI drive system is a lifetime-powered Alnico V magnet. This magnet replaces the rectifier, in effect, by providing an automatic, inherent magnetic rectification system which is simple, trouble-free and highly efficient. All energy (a two-way push-pull vibrating action) goes for productive performance. *Only Eriez vibratory feeders have this exclusive "two way" action!*

New HI-VI electro-permanent magnetic vibratory feeder has many of the features you asked for: greater output than other units of comparable physical size; totally-enclosed drive element; rust-proof, long-life spring; new design tray for more uniform feed; needs no rectifier!

Patent Pending

ENCLOSED DRIVE ELEMENT! NEW SPRING DESIGN!—The drive elements for this feeder are completely enclosed—no damage or loss of efficiency due to contamination by moisture or foreign materials. Special disc-shaped springs of bonded glass fiber have replaced the metallic leaf springs found in old-style vibratory equipment. Not subject to corrosion, "packing," fatigue or other critical characteristics of steel leaf spring systems, glass fiber springs will provide many years of dependable, trouble-free performance.

GREATER OUTPUT CAPACITY! Eriez' new vibratory feeder has a greater output capacity than other units of comparable physical size . . . gives you higher operating efficiency over broader operating ranges . . . lets you move more materials faster! Higher capacity percentage varies with the particular models in the line.

NOTICE THESE FEATURES, MANY OF THEM EXCLUSIVE!

Totally enclosed drive element • Long-life, disc-type glass fiber spring; can't rust • Greater capacity • Rectangular-shaped tray bottom for more uniform feed • Less sensitive to voltage change • Compact base doesn't interfere with tandem, side-by-side or back-to-back installations • Almost silent operation • Corrosion resistant • Larger, more powerful Alnico V magnet • No "airgap adjustment" needed • Units are lightweight, compact, easily installed • No sliding or rotating parts to wear • Low power consumption, maintenance and operating costs.

ERIEZ HI-POWR MAGNETIC SEPARATORS

ERIEZ HI-VI VIBRATORY EQUIPMENT

ERIEZ . . . pioneers and world's largest producer of permanent non-electric magnetic equipment for industry, has three major product lines to serve your needs: HI-POWR MAGNETIC SEPARATORS—to remove unwanted iron from processing lines of all kinds. HI-POWR MAGNETIC AUTOMATION UNITS—to solve numerous materials handling problems . . . convey, transfer, control, elevate, re-position, etc., ferrous materials or parts during many manufacturing processes. HI-VI VIBRATORY EQUIPMENT—Feeders, to move and accurately feed bulk materials; Unit (Bin) Vibrators, to keep bulk materials flowing evenly and smoothly through hoppers, bins, chutes, ducts, etc.

ERIEZ MANUFACTURING COMPANY
106-V Magnet Drive, Erie, Pa.

Please mail information on the new Hi Vi vibratory equipment to:

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

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Walworth iron body saddle type wedge gate valves are suitable for use on steam, water, gas, gasoline, oil, and many process lines. They are easy to take apart, simple to service, fast to reassemble. Walworth saddle-type valves are available in a wide range of sizes in eleven different combinations of design and materials including bronze-mounted, all-iron, and ni-resist; with both flanged and screwed ends. All types can be repacked under pressure when fully opened or fully closed.

Ask your local Walworth distributor to give you complete information or, write for circular.

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DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

WALWORTH SUBSIDIARIES: ALLOY STEEL PRODUCTS CO. • CONOFLOW CORPORATION • GROVE VALVE AND REGULATOR CO. SOUTHWEST FABRICATING & WELDING CO., INC. • M&H VALVE & FITTINGS CO. • WALWORTH COMPANY OF CANADA, LTD.

Co.'s warehousing and distribution operations.

Key to this technique is use of special hydraulic clamps (developed in conjunction with the Hyster Co.) that mount on masts of standard lift trucks. They are adjustable in width from 20-70 in., have large contact areas to curb crushing of bottled or packaged goods, and are rubber-surfaced to prevent load slippage. Other types of clamp attachments for pallet-less handling are now available from several fork-truck manufacturers.

At P & G, this system enables unit handling of as many as 412 individual cartons with total weight up to 3,000 lb.

Clamp pressure, controlled by a special valve on the truck, is adjustable for light, medium, and heavy products. As a result, only a few of the company's 300 items are not adaptable—those packaged in multiwall bags and in cartons of limited internal strength.

Biggest advantage cited for the technique is elimination of pallets. In addition, loads may now be stacked more evenly and kept from shifting when trucks start or stop suddenly or turn sharp corners. And should any carton damage occur, it is confined to the visible outside stack.

Furthermore, all of these gains were achieved without loss of warehouse cube or operating efficiency, and without additional safety hazard.

Circle 168D on Reader Service Card

Compressed Air Provides Faster Batter Mixing

Use of compressed air enables Maier's Bakery, Reading, Pa., to mix lighter, more uniform cake batter at 1½ times the former rate. In addition, this same air transports batter from mixing department to cake depositor some 35 ft. away.

Air pressure, developed by a 1-hp. compressor (Ingersoll-Rand Co., Phillipsburg, N. J.), is applied in a continuous-automatic mixer (Oakes). Air is injected just before batter enters head of machine, the amount being regulated for different types of cakes.

Compressor is a 2-stage unit rated at 200 psi. Equipped with intercooler, it is located in the basement and supplies clean air through a 125-ft. line.

Circle 171A on Reader Service Card

CUT COSTS WITH SEALTITE

- Delivers a well settled, nicely squared bag at top, bottom and sides
- Pre-scored, double fold, uniformly glued seal keeps product in and dirt out
- Uses any standard make of gusseted bag — no royalties
- Seal readily opened, yet tamper-proof
- Seals 30 to 50 bags per minute
- Users report costs reduced up to $500.00 per month per machine

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Every Kind

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Plates, Structurals, Bars, Sheets, Tubes, etc. Carbon, Alloy, Stainless Steels, Babbitt Metal.

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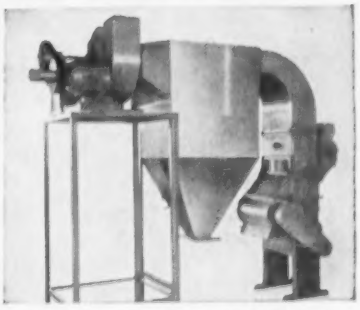

DESIGNED for automatic, foolproof separation of light or defective grades or chaff from raisins, green or dried lima beans, peas, dried beans, and grain, as well as all types of nuts and nut products.

For further information, on how the NEW Commercial Pneumatic Separator can improve your process and product, write, wire or phone.

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Discover for yourself this simple, low cost way to put more sales appeal in your products. For just a fraction of a cent per pound, Zest Monosodium Glutamate brings out more of nature's own flavor in the foods you process. Flavor that helps you make extra sales over competition.

In vegetables, impartial taste tests proved Zest enhanced the natural flavors of asparagus, corn, peas, beans, beets and others. In meat products, Zest imparts greater appetite appeal without necessitating any change in curing time or formula. In seafoods, Zest captures that fresh-caught taste... guards against flavor loss during processing... locks flavor in to build your reputation.

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NEW CATALOGS AND BULLETINS

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PLANT ENGINEERING

Plastic-Lined Plug Valves

Describes line of Teflon-sleeve stainless steel plug valves with aid of cut-way views. Bulletin S1, 2p. —*Continental Mfg. Co., New York City. (172A)*

Flexible Plastic Pipe

Has data and specifications for three grades of polyethylene pipe, and styrene alloy fittings. Also contains installation methods and applications. 16p.—*Franklin Plastics, Inc., Franklin, Pa. (172B)*

Grease-Proof Floor Tile

Folders show available colors and typical applications of grease-proof industrial floor tile. Files No. 23-D, G, 8p.—*Flintkote Co., Chicago Heights, Ill. (172C)*

Rotary Sludge Dryer

Photos show component details of rotary unit for drying industrial waste. Bulletin 572, 4p.—*Standard Steel Corp., Los Angeles. (172D)*

Water-Treating Reprint

ASME paper discusses water-treating processes for medium pressure boilers. Reprint No. 111, 8p.—*Cochrane Corp., Philadelphia. (172E)*

Reversing Transmission

Explains operation of transmission that combines forward, neutral, reverse and reduction positions. Form No. I, 4p.—*Snow-Nabstedt Gear Corp., Hamden, Conn. (172F)*

Quick-Dump Valves

Pictures valve line ranging from ¼-in. two-way and three-way, to 4-in. four-way electrically-operated units. Especially useful in hydraulic systems. Form 2B556, 6p. —*General Gas Light Co., Kalamazoo, Mich. (172G)*

Controlled Volume Pumps

Includes specifications and dimensions of controlled volume barrel pumps for metering out corrosive chemicals. Bulletin 1256, 2p.—*Milton Roy Co., Philadelphia. (172H)*

Canned Pumps

Describes construction and operation of line of fractional horsepower canned pumps. Eighty models are available in four different metals. 8p.—*Corley Co., Plainville, Conn. (172I)*

Refrigeration Filter-Dryers

Lists ratings for cartridge-type filter-dryers that absorb moisture from refrigeration systems. Various models and accessories are available. Bulletins G-11A, 17, 18. 8p.—*McIntire Co., Livingston, N. J. (172J)*

Diesel-Engine Compressors

Shows integrally-built diesel-engine compressors for use in isolated locations or where more compressor capacity must be obtained without greater demands on existing power facilities. Unit combines engine and compressor on single crankshaft. Form 3207, 8p. —*Ingersoll-Rand, New York City. (172K)*

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For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

Coupled Vertical Pumps

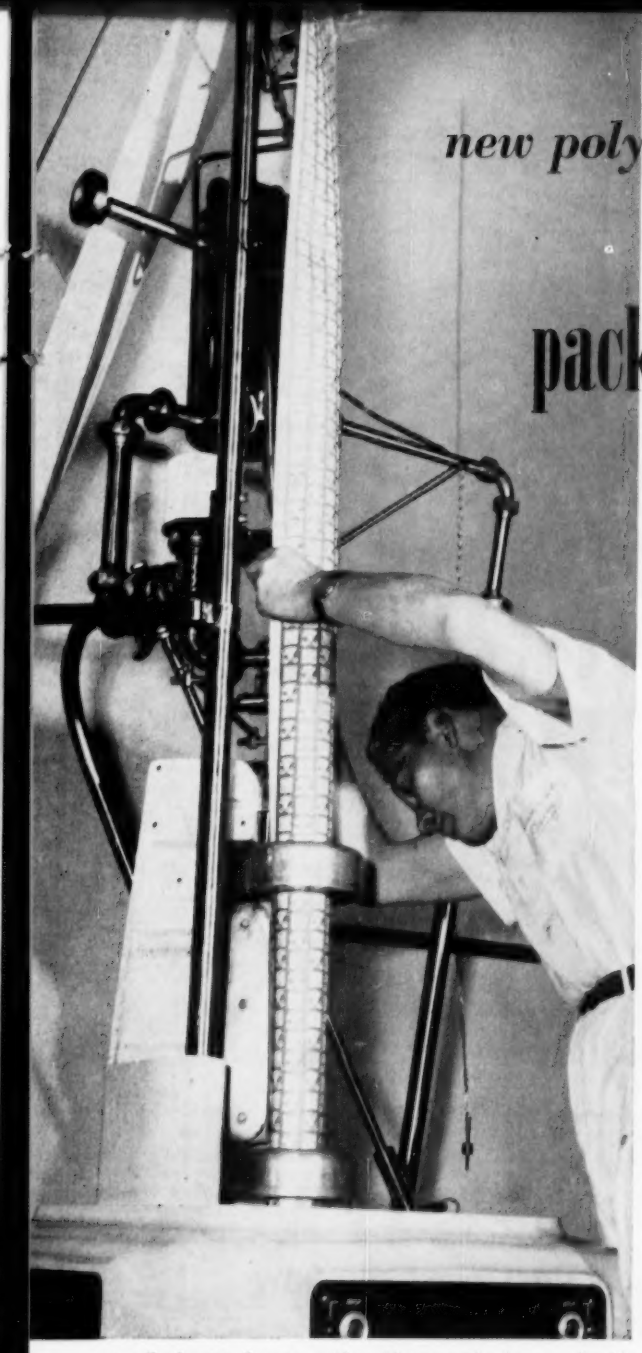
Bulletin, in color, explains uses of short coupled vertical service pumps. Advantages listed are low installation cost, reduced floor space, no priming necessary, no danger of flooding, and low maintenance and power cost. Bulletin FPP, 6p.—*Layne & Bowler, Inc., Memphis. (172L)*

Level Gage Illuminator

Illustrates liquid-level gage illuminator that is explosion-proof and has simplified re-lamping procedure. Data Unit 300, 2p.—*Jerguson Gage & Valve Co., Burlington, Mass. (172M)*

Stainless Steel Stock

Contains more than 20 tables on stainless steel sheets and strips, including detailed data on a stainless steel finder, corrosion resistance, fabrication properties, and weight tables. Also has stainless steel grade selection guide, and an



new polyethylene-coated container

Saves 50% on packaging costs for liquids

The new "Tetra Pak" container offers dual economies . . .

First, the packaging process is simple because the containers are simultaneously formed and filled in one continuous operation, using large rolls of specially prepared "Tetra Pak" paper.

Second, paper costs are cut almost one-half through the use of a coating specially formulated from BAKELITE Brand Polyethylene Resins. Crown Zellerbach Corporation states the added strength imparted by the polyethylene coating permits use of lighter weight stock than for conventional cartons. The coating also provides a positive seal.

To open, merely tear off any one of the four corners. To close, simply fold back the opened corner.

The "Tetra Pak" container is one more example of the many ways by which BAKELITE Resins serve the dairy industry. The resins include vinyls, polyethylenes, phenolics, epoxies, and styrene and vinyl acetate latices. Some are specially formulated for coatings used directly on packages and containers, others for protective finishes applied to processing equipment.

The actual coatings are supplied by formulators who employ these BAKELITE Resins for the wide variety of finishes available.

For names of these coating specialists, write Dept. ZD-63.

A roll of printed paper with coating based on BAKELITE Polyethylene is fed into this machine, heat-sealed at the base, filled with milk, cream or other liquid, then sealed into its four-sided shape . . . ready for market all in one continuous operation.

Shown is the "TEE-PEE" milk package marketed by Sunrise Dairies, Hillside, N. J. **Crown Zellerbach Corporation,** San Francisco, Calif., manufactures the coated rolls of paper, and provides technical assistance on the machinery used in this new packaging process.

IT PAYS TO PACKAGE IN MATERIALS MADE WITH

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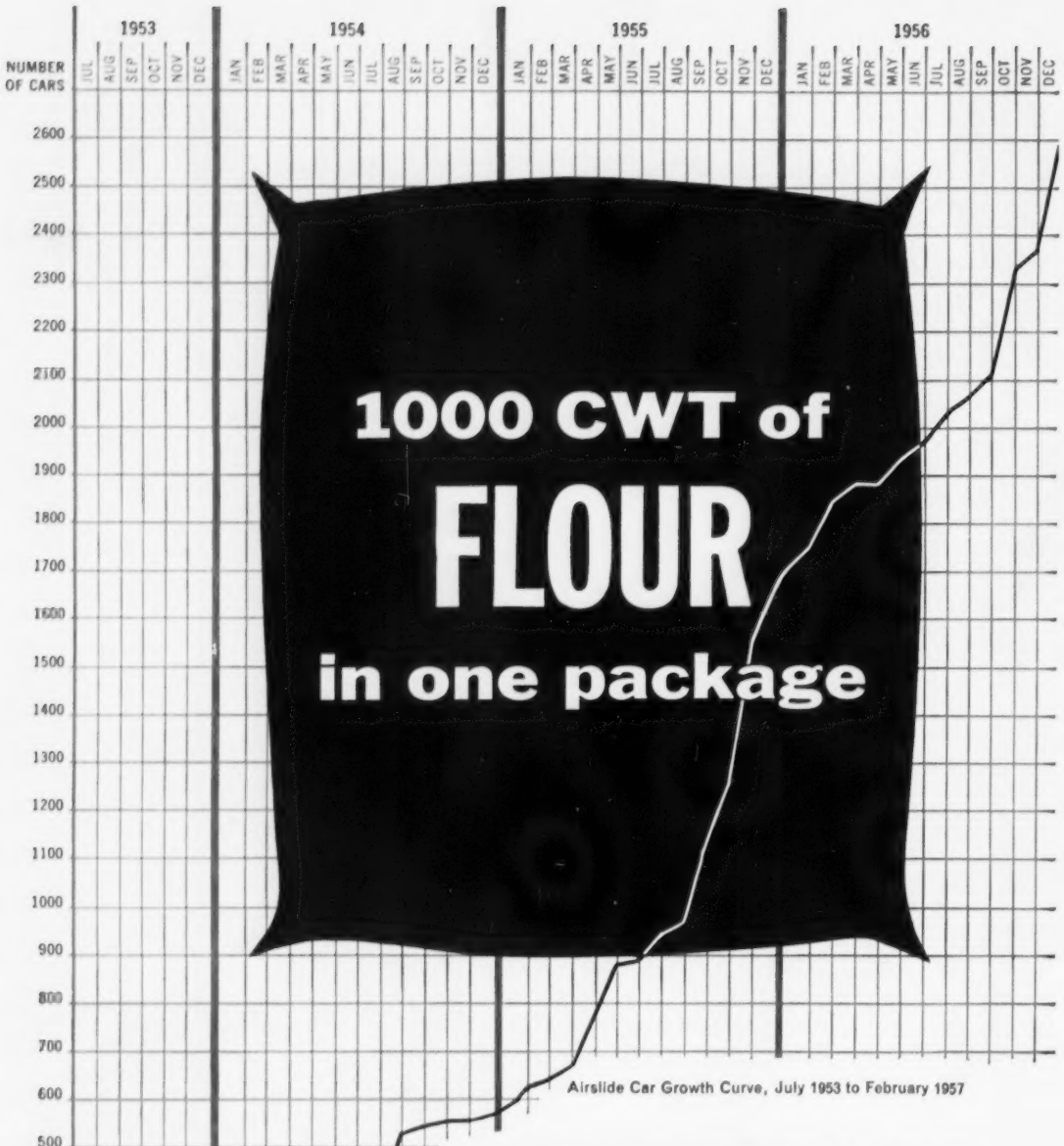
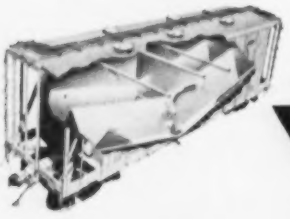


Airslide Car Growth Curve, July 1953 to February 1957

OVER 3000 AIRSLIDE® CARS NOW IN USE OR ON ORDER

The nation's millers and bakers were first to recognize the value of Airslide cars. Today, these industries are among the principal users of this safe, clean, economical method of bulk transportation. Over 3000 Airslide cars are now in use or on order. They require no re-spotting, provide far more clearance for unloading and can be unloaded into any conveying system as fast as the system permits. If such requirements are important to you, write today for full information about General American's new Airslide car.



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index of applications. Bulletin FS 38, 32p.—*Allegheny Ludlum Steel Corp., Pittsburgh.* (172N)

Asbestos Textile Manual

Fact-loaded reference manual guides selection of asbestos textiles. For the non-technical user, it covers cloth, tape, tubing, lap, roving, cord, wick, and rope. Publication 76-327, 16p.—*Union Asbestos & Rubber Co., Bloomington, Ill.* (175A)

High Pressure Tubing

Informs on special alloy tubing, pipe, welding fittings, and flanges for use at high pressures and temperatures. Two folders present technical data. Technical Data Card 145-A, 152-A, 8p.—*Babcock & Wilcox Co., Beaver, Falls, Pa.* (175B)

Variable Speed Belts

Explains features of variable speed belts that include built-in synthetic fiber cloth, arched cross-section, abrasion-resistant cover stock, accurate underside matching, and static conducters. Also has listing of comparative belt numbers of various manufacturers and key to belt numbering. Bulletin 1640-B1, 8p.—*Worthington Corp., Harrison, N. J.* (175C)

Tubing Tolerance Chart

Furnishes data on tolerances for steel tubing and pipe including permissible variations in O.D., I.D., wall, ovality, and straightness. Data chart SEC. B. No. 1, 2p.—*Peter A. Frasse & Co., New York City.* (175D)

Mineral Wool Insulation

Specifies application methods for sectional-type molded mineral wool pipe insulation that snaps into place. Insulating properties are explained and thermal conductivity is shown graphically. Brochure J-432, 4p.—*Baldwin-Hill Co., Trenton, N. J.* (175E)

New Engineering Materials

Introduces family of basic materials, harder than high carbon steel, lighter than aluminum, and up to nine times stronger than plate glass. Called Pyroceram, the new materials are not yet available in commercial quantity. 6p.—*Corning Glass Works, Corning, N. Y.* (175F)

Line of Gear Motors

Photos, drawings, and tables give performance and dimensional data for an extensive line of gear motors ranging to 60 hp. Aluminum cases are available and table lists typical applications of these units. Bulletin 60-2, 24p.—*Electra Motors, Inc., Anaheim, Calif.* (175G)

Positive Flow Control

Covers line of proportioning pump and diaphragm valves that fill requirement for positive proportioning of flow in the range of 0-730 gph. Includes technical data and selection chart. Catalog 800, 12p.—*Hills-McCanna Co., Chicago.* (175H)

Metal Spinning Uses

Explains the what, why, and how of using metal spinning for fabricating equipment. Attractive presentation has photos, drawings, charts and tables. 36p.—*Phoenix Products Co., Milwaukee.* (175I)

Eddy-Current Brakes

Furnishes data on liquid and air-cooled eddy-current brakes. Fundamentals are explained and wide variety of units are offered. Bulletin BR-3, 12p.—*Eaton Mfg. Co., Kenosha, Wis.* (175J)

Custom-Made Equipment

Explains functions of specialized staff and facilities for custom fabrication of parts and equipment. 12p.—*Tornqvist Co., Clifton, N. J.* (175K)

PROCESSING

Tilting Batch Mixers

Describes line of tiltable batch mixers in a variety of shapes and sizes up to 600-gal. maximum working capacity. Bulletin B12, 4p.—*Gruendler Crusher & Pulverizer Co., St. Louis, Mo.* (175L)

Precise Liquid Feeding

Features stainless steel unit reported to feed liquid reagents with precision, dependability, and low cost. Bulletin 575, 4p—*Clarkson Co., San Francisco.* (175M)

Volumetric Dry Feeder

Well-diagrammed brochure describes construction of unit designed to feed any dry material over a 40:1 adjustable feed rate. Various models, design features, principles of operation, and allied accessories are covered. Also has capacity and dimensional data. Bulletin 20-P2, 8p.—*Omega Machine Co., Providence, R. I.* (175N)

Industrial Filter Paper

Work-book type presentation presents review of filtration practice. Has valuable technical data and glossary, and includes a list of applications for each type of filter paper offered. Catalog 357, 24p.—*Eaton-Dikeman Co., Mt. Holly Springs, Pa.* (175O)

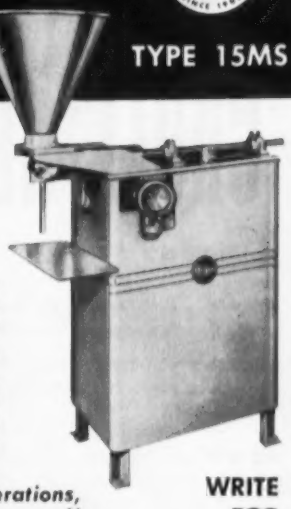
Sanitary Positive Pumps

Colorful sheets give data on line of sanitary positive displacement pumps. Includes instruction manual, parts price list, performance ratings, and part-by-part descrip-

NEW... FILLING MACHINE

Hope ESTABLISHED SINCE 1903

TYPE 15MS



... You can buy several for less than the cost of one big machine

Another first for Hope . . . This new, small, streamlined floor model accurately handles liquid, viscous and semi-solid products quickly and at the lowest possible cost! Excellent for pilot runs, small operations, laboratory testing, small batches and short production runs of a color or product.

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THE King PRODUCT KOOLER

2 TYPES: Suspended type (left) for ceiling mount or floor type (above) sectionalized for easy installation.

Modern service-tested cooling units for precooling and preservation of foods . . .

"M" series King Koolers operate at slow speed to maintain temperatures 25° to 45° F. with ammonia or freon refrigerants. Centrifugal blower type fans. Air is pulled—not pushed—through coil, saving on power and refrigeration load. Simple defrosting. With automatic temperature control, system defrosts during off cycle when temperatures are above freezing. Water defrosting sprays optional. A compact package unit, easily, quickly installed. Built for long service available in 3000 to 18,000 CFM sizes.

There's a King Product Kooler to fit your needs... Write for your bulletin NOW!

THE King CO. OF OWATONNA

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40 Forward Years FOR CROLL-REYNOLDS

1917 Croll-Reynolds Co. established; work on EVACTORS, started previously by the two founders, now enters new phase.

1920's Croll-Reynolds contributes greatly to the power field's efficient use of intercondensers between stages for steam economy.

1930's Croll-Reynolds focuses on the need for high vacuum in the growing chemical field—gives special attention to design of 4 and 5 stage EVACTORS, and also to the application of steam jet refrigeration equipment.

1940's Croll-Reynolds directs activity toward war effort, supplies a great number of EVACTORS for shipboard use, special units for the atomic program, and equipment for manufacturing new types of explosives and chemicals. **In the late 1940's,** Croll-Reynolds develops and supplies vacuum equipment for vacuum cooling of fresh vegetables.

1950's Croll-Reynolds develops special condensing tower used to recover entrained materials and to prevent contamination of cooling water—especially adaptable for deodorizers in the fatty acid and allied industries.

PRESENT Croll-Reynolds continues to develop and perfect new kinds of jet and condensing equipment with the knowledge and skill that has enabled the Company to establish an enviable record. In its Forty Forward Years, Croll-Reynolds has—

- Supplied equipment for vacuum cooling of fresh vegetables with a combined **daily** capacity of 2000 cars **each** holding 25,000 to 30,000 lbs.
- Designed and manufactured **all** the commercial vacuum cooling equipment **used** to date in the electrolytic zinc industry of the U. S. and Canada.
- Supplied **more** vacuum cooling systems for the Viscose-Rayon industry than **all other manufacturers combined.**
- Pioneered many new applications of vacuum and vacuum refrigeration.

Croll-Reynolds Company, Inc. is confident that in the future, as in the past, they will continue to develop new types of industrial jet equipment and improve existing designs.

Croll-Reynolds CO., INC.

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FUME SCRUBBERS • SPECIAL JET APPARATUS

tions. Bulletin 1957-A, G, 28p.—*Waukesha Foundry Co., Waukesha, Wis. (175P)*

Cocoa Solubilizer

Illustrates unit for making dry cocoa products easily soluble. Has dimension diagram. 4p.—*Blaw-Knox Co., Mora, Minn. (176A)*

Pocket-Size Equipment Guide

Summer inventory booklet lists new and used equipment items, 12p.—*First Machinery Corp., Brooklyn, N. Y. (176B)*

Stainless Meat Tenderizer

Shows unit with improved knitting action for profitable merchandising of lean meat trimmings. Tenderizer features enclosed and permanently lubricated gear drive, lift-out cutting unit, comb-type strippers, nylon spacers. Form 1573, FTI, 2p.—*U. S. Slicing Machine Co., LaPorte, Ind. (176C)*

Stainless Steel Reactor

Describes units ranging in size from 5 to 2000 gal. equipped with conventional and dimpled jackets. Many drives, seals, stuffing boxes, agitators, fittings, and accessories are listed. Bulletin 944, 16p.—*Pfaudler Co., Rochester, N. Y. (176D)*

Liquid Indicators

Concerns window observing units for liquids mounted in brass body. Available in 16 stock sizes. Bulletin G15, 2p.—*McIntire Co., Livingston, N. J. (176E)*

Pulverizer, Classifier

Comprises component drawings and technical discussion of air attrition impact pulverizer. Unit has controlled radial inverse air classification through differential centrifugal pressure. Bulletin NPB 6-645, 4p.—*Strong Scott Manufacturing Co., Minneapolis. (176F)*

Napped Spun Synthetic Filter

Contains sample of napped spun Orlon filter fabric recommended for use where very small particle retention with high flow rate is required. Features, characteristics, and lab test data are listed. 2p.—*Filtration Engineers, Inc., Newark, N. J. (176G)*

Diverse Mixer Line

Describes line of double-arm, spiral-ribbon, and vertical mixers suitable for a wide-range of capacities and material viscosities. Bulletin 1483, 8p.—*Capitol Products Corp., York, Pa. (176H)*

Fiber Filter Data Sheets

Indicates resistance of various fiber filter elements to 120 chemically-active liquids at various operating temperatures. Sheets include technical description of filters. Bulletin AFD50-1B, 6p—*Commercial Filters Corp., Melrose, Mass. (176I)*

Mechanized Pastry Units

Pictures machines and molds for making pies, tarts, and other pastries for baking, frying, or freezing. 4p.—*K&M Machine Co., Memphis. (176J)*

Batch Pressure Filter

Has description of design, construction, and operation of pressure-filter unit. Typical installation flowsheet and specification chart are also included. Bulletin 7400, 4p. — *Dorr-Oliver Inc., Stamford, Conn. (176K)*

PACKAGING

Heat-Sealing Units

Catalogs line of heat sealers including thermal impulse unit with recycler. 10p.—*Vertrod Corp., Brooklyn, N. Y. (176L)*

Chub Packaging Machine

Names applications and pictures machine for forming, filling and closing 1800 chub packages per hour. 2p.—*Kartridg-Pak Machine Co., Chicago. (176M)*

Multiple Glass Packaging

Shows unit for automatically making 2-, 3-, and 4-jar cartons. Built-in dividers reduce breakage. 4p.—*Gardner Board & Carton Co., Middletown, Ohio. (176N)*

Aluminum Bottle Caps

Pictures machinery and includes sample caps for sealing milk bottles. 4p.—*Basca Mfg. Co., Indianapolis, Ind. (176O)*

Non-Skid Container

Explains how special gripping surface on corrugated containers eases their handling, and stacking. 4p.—*Stone Container Corp., Chicago. (176P)*

Package Label Pasters

Covers 14 models of manual, electric, and automatic feed label pasters. 2p.—*Better Packages Inc., Shelton, Conn. (176Q)*

Packager Components

Details construction and operation of the following packaging unit components: Weighing cell, self-tearing fill control, control relay, and package classifier. Models 209, 213, 216, 217. 8p.—*ACF Industries, Paramus, N. J. (176R)*

Packet Filling Machine

Diagrams mechanism of unit for filling small packets for in-

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GOOD FLAVORS!

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Try FRITZSCHE'S flavorful

FRUIT FLAVORS with Other Natural Flavors

Fruitier, more natural effects

Richer tasting

Better aroma

Standardized strength

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Nine delicious flavors

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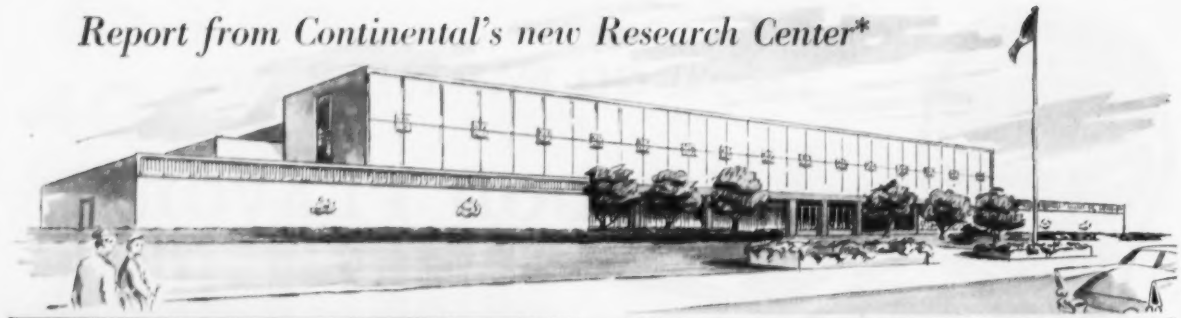
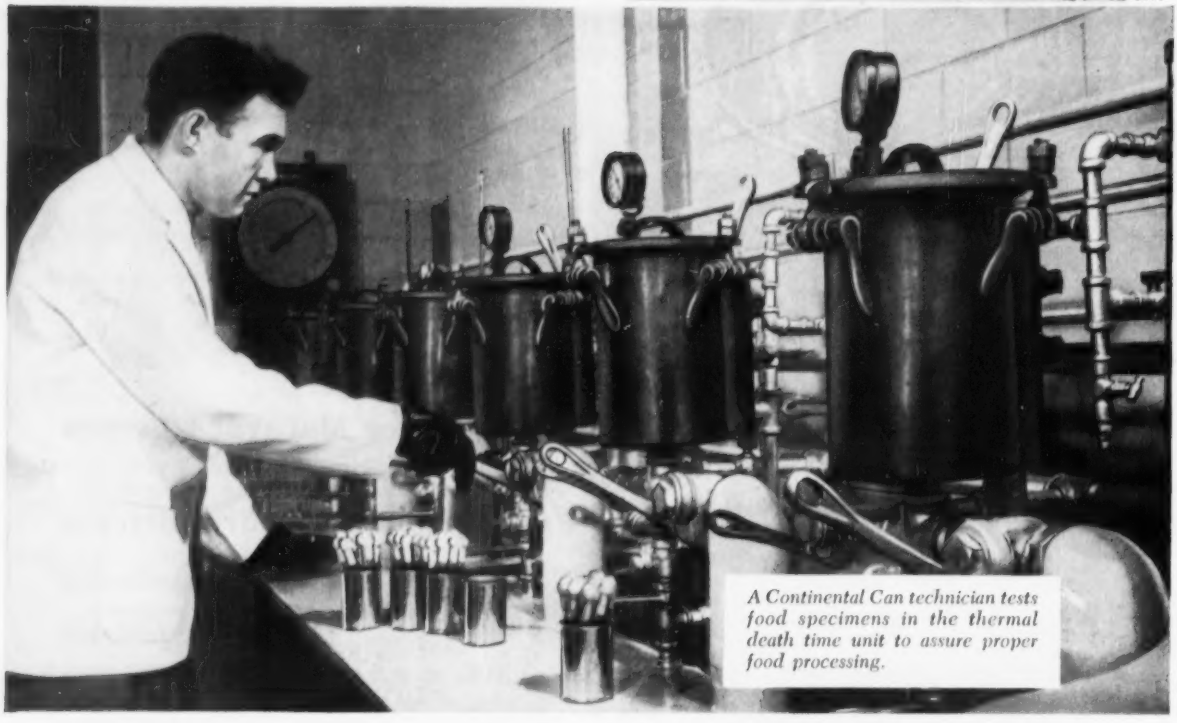
*Report from Continental's new Research Center**





A Continental Can technician tests food specimens in the thermal death time unit to assure proper food processing.

THERMAL DEATH TIME SYSTEM HELPS IMPROVE PROCESSING OF CANNED FOODS

The thermal death time unit is a vital part of Continental's research program to improve canned food processing. Continental's process engineers use this system to determine the most effective means of killing food-spoiling bacteria.

First, tests are made on food specimens that have been inoculated with typical food spoilage organisms. Placed in cotton plugged tubes, these specimens are rapidly heated and cooled with steam operated equipment. Temperatures for this study range as high as 270 degrees F.

Later the research scientists repeat the experiment, duplicating actual commercial production, processing the food in small cans. After a period of incubation, researchers check to see which organisms survive a given time and temperature of heat sterilization.

These exhaustive studies enable Continental's engineers to recommend the best method for processing canned foods. If you have a processing problem . . . call us. Our engineers will welcome the opportunity to help you solve it.

***TOP AWARD WINNER**

For the excellence of its modern, scientific design, Continental's new $7,500,000 Chicago research center has won the honor award of the Chicago chapter of the American Institute of Architects and the Chicago Association of Commerce and Industry.

QUALITY Continental SERVICE

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

dividual servings. Weights up to 1 oz. are formed and filled from a single roll of heat-sealing paper at up to 100 per minute. 4p.—*Brown Bag Filling Machine Co., Fitchburg, Mass. (176S)*

Heat Sealing Units

Covers line of machines for sealing plastic films, including hand, rotary hand, and foot-jaw units. Parts breakdown and application photos are included. 3p.—*Doughboy Industries, Inc., New Richmond, Wis. (179A)*

Tackers and Staplers

Illustrates line of automatic tackers, staplers, and staples. Includes description and typical application photos. 28p.—*Fastener Corp., Franklin Park, Ill. (179B)*

Seafood Packaging Ideas

Pictures attractive packages for various seafood products. Discusses advantages of aluminum containers. Form 205, 4p.—*Ekco-Alcoa Containers, Inc., Wheeling, Ill. (179C)*

Can Making Machinery

Gives description of line of single, gang, and automatic duplex splitters as well as scroll shear for medium and high speed can making. Also illustrated and described are a body blank stacker, motor-driven grinding attachment, and line of slitter accessories. Section 1, Catalog 36-D, 12p.—*E. W. Bliss Co., Canton, Ohio. (179D)*

Case Opener and Former

Describes operation of machine that selects a flat case from a magazine, advances it, applies glue, opens and forms it, and folds in the bottom flap and seals. 1p.—*Schroeder Machines Corp., Syracuse, N. Y. (179E)*

Fresh Produce Boxes

Shows basic designs of corrugated boxes for fresh fruits and vegetables including full-telescope, tray, and gift package styles. 4p.—*Gaylord Corp., St. Louis, Mo. (179F)*

Brine Dispensing Unit

Has facts on electronically controlled unit that automatically dispenses brine or other liquids in accurate amounts to a maximum line speed of 300 containers per minute. 8p.—*International Salt Co., Scranton, Pa. (179G)*

INGREDIENTS

Sweetener Application Data

Presents facts on specific procedures to follow when using low-calorie sweetener in carbonated beverages, dietetic canned fruits, gelatin desserts and puddings, pickles, and catsup. Data Sheets A-136b, 2250, 2251, 3457, 3847. 12p.—*E. I. du Pont de Nemours and Co., Wilmington, Del. (179H)*

Soy Flour Roundup

Has brief run-down on soy flour utilization, composition, types, properties, and applications. 12p.—*Archer-Daniels-Midland Co., Minneapolis. (179I)*

MSG In Meat and Poultry

Furnishes formulas and technical information for the proper application of monosodium glutamate in various meats and poultry. 24p.—*Glutamate Manufacturers' Technical Committee, San Francisco. (179J)*

Salt Types and Applications

Attractively illustrated booklet explains the production and properties of four basic types of salt. Applications are discussed. Form No. 028, 16p.—*Diamond Crystal Salt Co., St. Clair, Mich. (179K)*

Antioxidant Analysis Notes

Has details of the extraction of three classes of antioxidant from a variety of foods and packaging materials. Also has qualitative tests and other analytical information. TDR No. G-101, 16p.—*Eastman Chemical Products, Inc., Kingsport, Tenn. (179L)*

MATERIALS HANDLING

Automatic Dockboards

Describes dockboard line stated to automatically adjust to truck beds the instant the truck contacts the dock. Bulletin D-160, 4p.—*Kelley Co., Milwaukee. (179M)*

Powered Loading Docks

Two sheets cover fixed and portable, powdered hydraulic loading docks. Units are stated to have plug-in power line, remote control operation, and automatic adjustment. Bulletins WI-045,077, 4p.—*Wayne Pump Co., Fort Wayne, Ind. (179N)*

Belt Conveyor Idlers

Provides technical data for a line of belt conveyor idlers including troughing, picking table, flat carrying, flat return, and other types of idlers. Form No. 75-83, 8p.—*C. O. Bartlett & Son Co., Cleveland. (179O)*

Overhead Conveyor

Depicts construction of overhead conveyor consisting of a series of load hangers moved by small wheel units that roll on tracks. 4p.—*Econ-O-Veyor Corp., Glen Cove, N. Y. (179P)*

DEPENDABLE! EFFICIENT! LASTING!

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Jr. Catalog 54 G—General Purpose, Warehouse Trucks, Casters and Wheels

Bulletin 48 JS—Jacks and Skids for Mobile Storage

Bulletin 54 DJ—Dairy Industry Trucks

Booklet 53 SR—General Purpose Trucks and Barrel Handling Equipment

Bulletin 53 SC—Trucks for In-Plant Feeding

Bulletin 54-TL—Trucks for Use with Overhead or Under-Floor Powered Conveyors.

Bulletin D—Demountable rubber tired wheels for floor trucks, trailers and casters.

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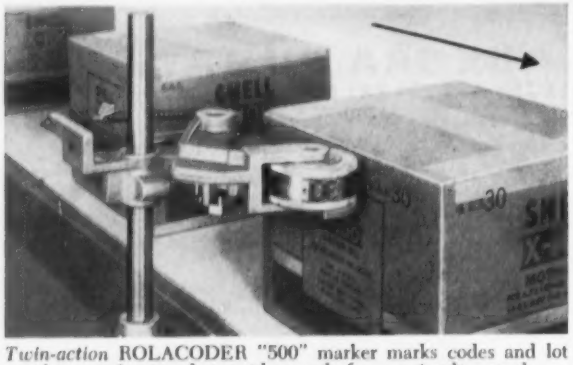
Compact ROLACODER machines mark 1, 2 or 4 sides of cartons, cases, drums, bags, etc. automatically

Friction-operated ROLACODER "100" machine makes single, accurate "spot" imprint of brand names, varieties, code-dates, lot numbers on one side of containers as they travel on conveyors or through case-sealer. Prints from 1 to 5 lines of copy up to 12" long from easily interchangeable rubber type.



Twin-action ROLACODER "500" marker marks codes and lot numbers on *front* and *one side panel* of cases simultaneously . . . in a single pass. Friction-operated . . . imprints legends containing up to 8 letters and figures.

Solenoid-activated twin-action ROLACODER "200" machine imprints codes and lot numbers on *rear* and one side panel (or rear only). When mounted in tandem with ROLACODER "500" machine, cases can be marked on all 4 sides simultaneously without requiring that they be turned.

Gottscho

Write for new Bulletin "ROL-2"

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Automatic CODING, MARKING, IMPRINTING MACHINES

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Flexible Conveyor Belt

Considers uses of a conveyor belt engineered for small diameter pulleys. Belt combines flexibility of solid woven belting with strength and low elongation characteristics of stitched canvas. Bulletin RI 8507, 4p.—*Russell Mfg. Co., Middletown, Conn. (180A)*

Materials Handling Line

Catalogs handling units including gravity wheel conveyors, roller conveyors, portable stands, power belt conveyors, flip switches, junctions, spurs, and floor-to-floor conveyors. Form GC-257, 14p.—*Speedways Conveyors, Inc., Buffalo, N. Y. (180B)*

Elevating Conveyors

Has notes on interlocking bucket design elevating conveyors. Buckets are gently filled by vibratory, belt, or gravity feeds. Standard models run to 18 cfm. capacity.—*Lynch Robo Corp., Anderson, Ind. (180C)*

Truck Service Schools

Informs on mobile field service school equipped for classroom study and practical laboratory work on industrial truck maintenance. Sessions include practical laboratory application and individual instruction. Bulletin SP 4400, 8p.—*Clark Equipment Co., Battle Creek, Mich. (180D)*

Loading Procedures

Contains drawings of recommended car preparation, and bonded block loading procedures. 4p.—*Institutional Wholesale Grocers Assn., Washington, D. C. (180E)*

Pneumatic Tired Casters

Catalogs line of pneumatic and zero-pressure tires. These are said to insure smooth rolling and quiet operation with little maintenance. 4p.—*Darnell Corp., Ltd., Downey, Calif. (180F)*

Motor-Driven Trolley

Furnishes data on powered trolley that can be used with hand or electric hoists, up to a load capacity of 3 tn. Operates on I-beams, rolled overhead track systems, or splice plates. Bulletin 1507, 4p.—*Yale & Towne Manufacturing Co., Philadelphia, Pa. (180G)*

Electric Fork Trucks

Describes construction and components of a new line of electric fork trucks. Bulletin SP-4302, 8p.—*Clark Equipment Co., Battle Creek, Mich. (180H)*

Battery Film

Informs on availability of a film concerning industrial truck power. 2p.—*McGraw-Edison Co., West Orange, N. J. (180I)*

Hand-Trucks, Dock-Boards

Describes construction of aluminum hand trucks and dock boards. Company will answer special needs. Bulletin VB11156-1, 4p.—*Voltz Bros. Inc., Chicago. (180J)*

Steel Shipping Container

Considers light-weight steel shipping and storage container that has bell-type opening, recessed corners, conical transition, formed ridges, and a pivot lift pipe. Specification drawings and application photos included. 10p.—*Delta Tank Mfg. Co., Baton Rouge, La. (180K)*

Truck Batteries

Discusses construction and operating features of a line of industrial electric truck batteries. Contains performance curves and description of all parts. Form 5161, 12p.—*Electric Storage Battery Co., Philadelphia. (180L)*

Flat-Top Conveyor Chain

Announces rivet-free nlyon flat-top carrying surface with precision steel roller chain. Illustrates its use in conveying cans, bottles, packages, and other items. Folder 2492, 4p—*Link-Belt Co., Chicago. (180M)*

Hand Pallet Truck

Illustrates improved hand truck with reinforced handle, relocated grease fitting, and stronger alloy steel axles. Has application information. Bulletin 2226, 2p.—*Raymond Corp., Greene, N. Y. (180N)*

MANAGEMENT

Management Consultation

Reports on how the management consulting profession serves American business. 12p.—*Association of Consulting Management Engineers, Inc., NYC. (180O)*

Equipment Financing Plan

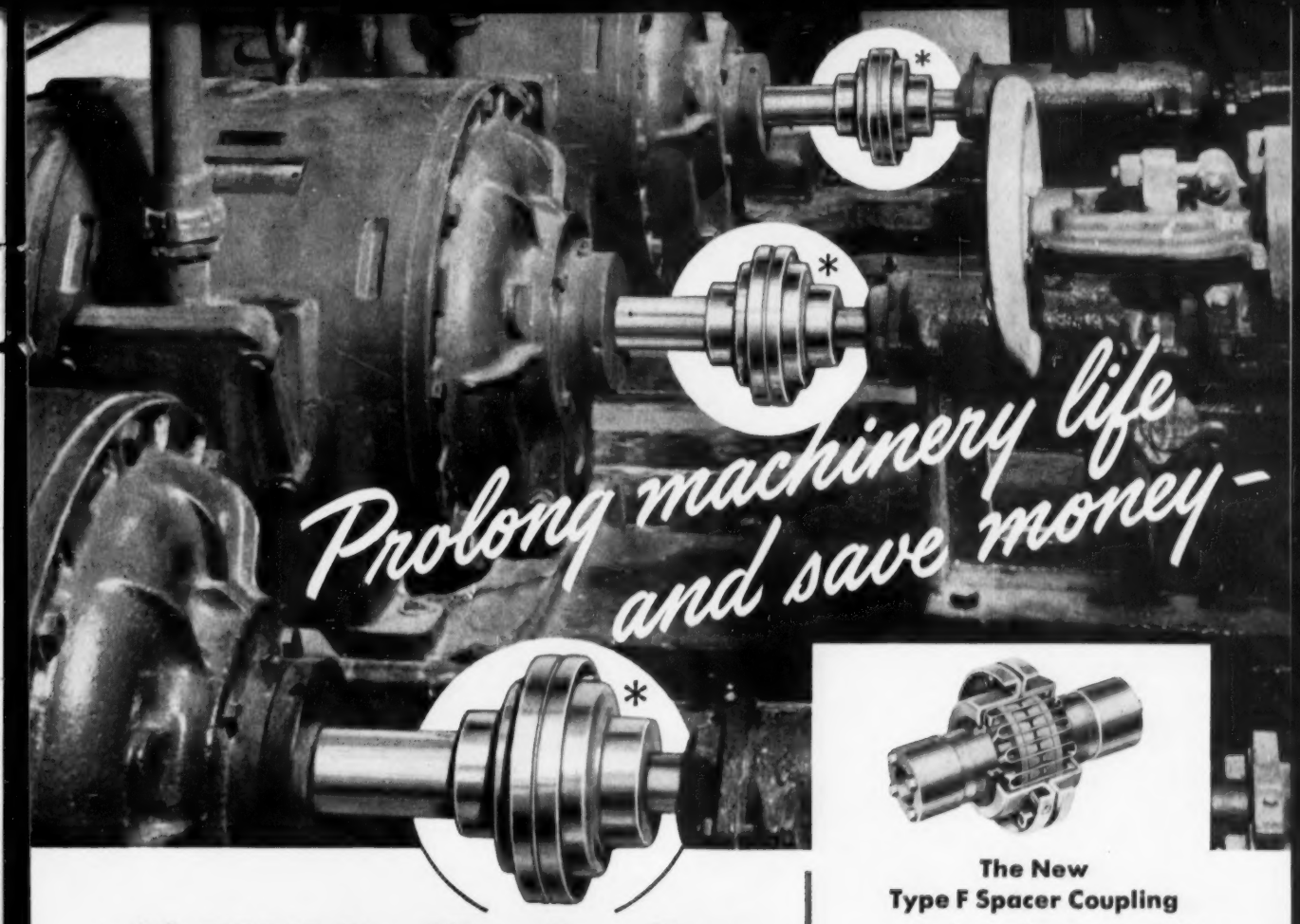
Has questions and quick answers plus payment data tables on equipment financing. Form 884-J, 4p.—*J. C. Corrigan Co., Boston. (180P)*

Hiring an Engineering Firm

Answers these three questions for companies with engineering problems: (1) Do we need an engineering firm?; (2) Which one?; (3) What are the results to be expected? 8p.—*Teller Co., Butler, Pa. (180Q)*

Bakery Business Letters

Reprint of articles that have tips on selling bakery products. In-



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* A single basic type—the famous Type F—fills 90% of all industrial application needs. It is versatile, efficient and economical. And—it is always available from factory, field or distributor stocks, in a wide range of sizes.

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The New Type F Spacer Coupling

Here is a Steelflex coupling specially designed to permit fast, easy installation and removal in horizontal and vertical applications where it is impracticable to move the connected units—or where a space-gap (up to 12 in.) is necessary.

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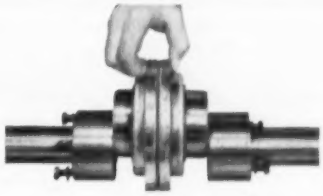

The Steelflex Spacer coupling is prelubricated at the Factory and can be installed, or removed and reinstalled, without disturbing the lubricant—a highly desirable feature.

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The superior dairy ingredient that improves quality and reduces cost

Spray-process Sweet Dairy Whey gives you 50% more milk sugar, 50% more albumin protein, and more milk minerals too. Add them all up and you've got more mouth-watering taste, more eye-catching color and a more uniform consistency in all of your products. Best of all...you can easily save up to 40% on dairy ingredient costs.

Western's Sweet Dairy Whey is completely quality controlled from laboratory to production. It meets or exceeds U. S. Extra Grade standards in every respect. Try this pure dairy ingredient today and see how it can improve *your* profit picture.

For complete information and a working sample, please write our Technical Service Department 117.

Here are a few of the products improved by Sweet Dairy Whey:

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cludes information on women's spending habits, customer complaints, publicity, relations. Vol. 7, No. 9, 3p.—*Westco Products, Los Angeles. (180R)*

Plug-in Supervisory Control

Treats of system that utilizes plug-in components to remotely control operation of any combination of pumps, valves, gates, and similar devices. Bulletin 240-P2A, 12p. — *Builders-Providence, Inc., Providence, R. I. (183A)*

Fire Protection Economics

Explains how investment in automatic sprinkler protection can amortize itself out of insurance savings, and bring other economic benefits. Actual examples included. Bulletin 78, 8p. — *Automatic Sprinkler Corp. of America, Youngstown, Ohio. (183B)*

SANITATION

Sanitary Dairy Brushes

Has description of special properties of new plastic material for brushes, and on-the-job photos of a large number of these brushes in dairy plants. Bulletin A4443, 20p.—*E. I. du Pont de Nemours & Co., (Inc.), Wilmington, Del. (183C)*

Sanitizing Stainless Steel

Easy-to-read illustrated booklet explains causes of corrosion, how to determine if a bactericide is corrosive, how to prevent corrosion, plus other tips on sanitizing stainless steel units. Bulletin 203, 16p.—*Diversey Corp., Chicago. (183D)*

Light Duty Steam Cleaner

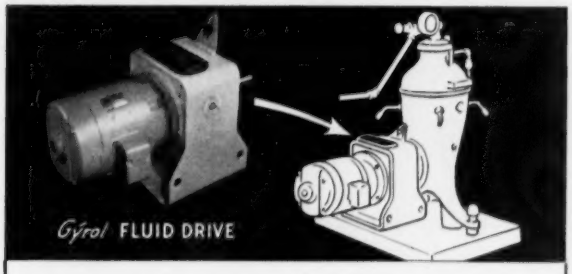
Describes self-contained unit, operating on any water pressure, for general utility steam cleaning. Machine carries 10-year service guarantee. Catalog 704, 4p.—*Clayton Mfg. Co., El Monte, Calif. (183E)*

Food Industry Brushes

Catalog, with streamlined reference feature, describes line of brushes for dairy and food industries. Includes brushes for bottle cleaning, laboratories, and pipes and fittings. Bulletin Q16, 8p.—*Creamery Package Mfg. Co., Chicago. (183F)*

Ultrasonic Cleaning Unit

Presents technical data on ultrasonic cleaning tanks for removal of soils difficult to dislodge, and cleaning complex and intricate parts. Bulletins #S10-13, 16p.—*Branson Ultrasonic Corp., Stamford, Conn. (183G)*



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The extended accelerative cycle of many separators makes motor maintenance a problem. Special motors and controls designed for long acceleration are costly. Gyrol Fluid Drive with a straight induction motor permits motor to be started unloaded; the separator can then be accelerated smoothly and positively by the Gyrol.

The advantages of a Gyrol Fluid Drive — adjustable speed, no-load starts, cushioned power, automatic control — will help smooth your production. Call our nearest branch office for full data. Or write: American Blower Division of American-Standard, Detroit 32, Michigan. In Canada: Canadian Sirocco products, Windsor, Ontario.

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Division of AMERICAN-Standard

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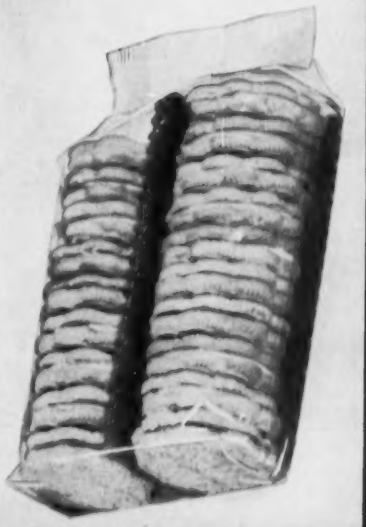

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Moisture can't get in . . . the product can't get out! The Kehr "Clearvelope" bag is completely seamless front, back and bottom . . . a unique moisture-proof and sift-proof construction that lends itself to automatic, semi-automatic and hand filling operations with minimum handling costs.

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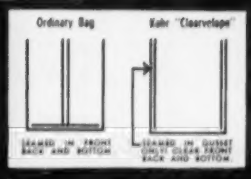

1. Saves dollars on cost of bag and on filling operation.
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Gentlemen: Kindly send me further information about your new ☐ "CLEARVELOPE" bag.
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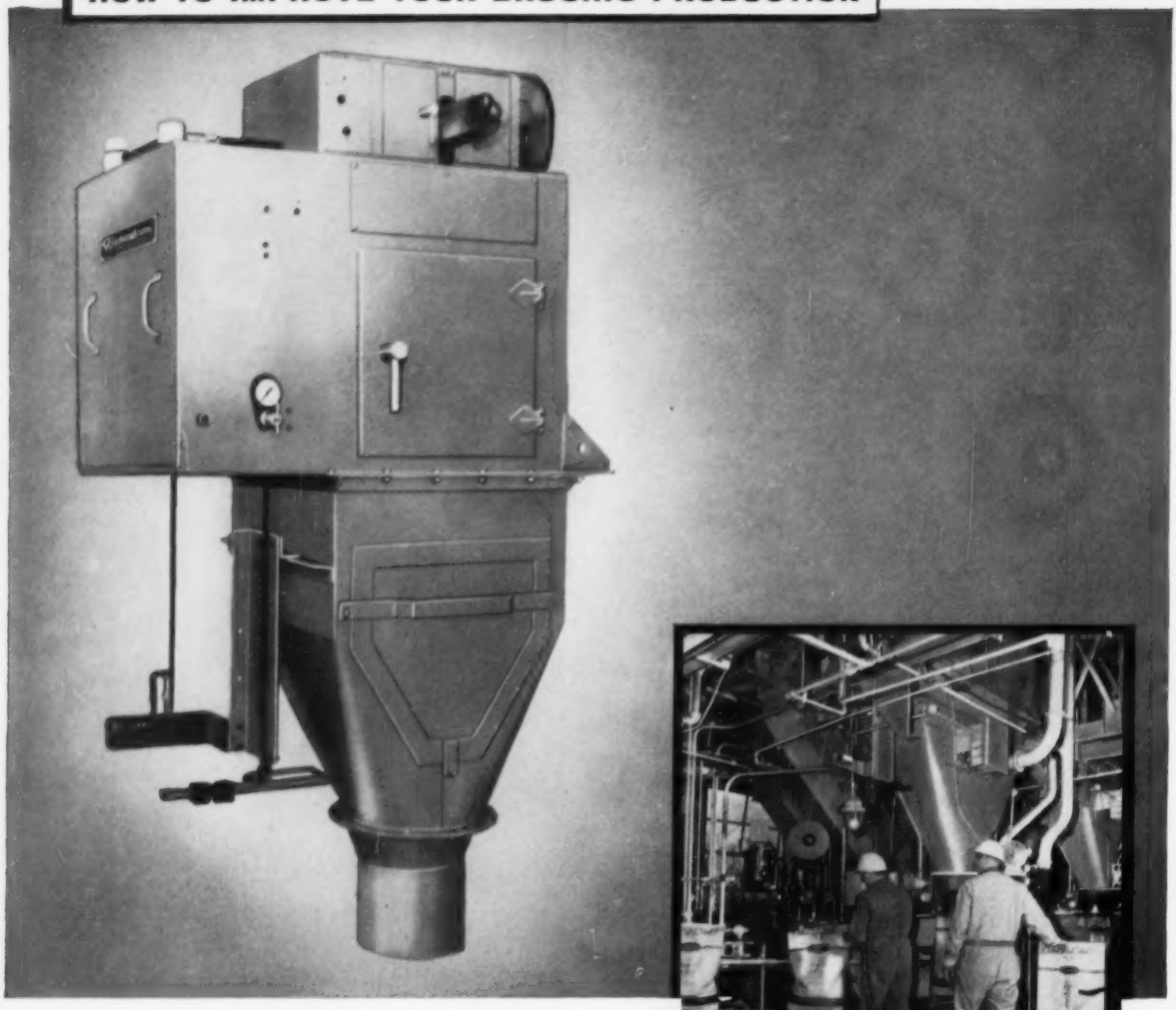
HOW TO IMPROVE YOUR BAGGING PRODUCTION



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give faster speeds with closer accuracies

Efficient and reliable bagging scales are the answer to today's need for faster production and lower per unit cost. Richardson Scales meet these requirements. And you avoid inaccuracies of underweights and overweights even at high bagging speeds. With over 55 years of experience in materials handling by weight, Richardson produces the highest quality bagging scales to provide stepped-up operations at lowest over-all cost. Simplicity of design and sturdiness of construction assure long life and dependability.

Richardson Bagging Scales are available in many models for many types of materials handling in bagging ranges of 25-250 lbs. The E-50 illustrated is extremely versatile in bagging most types of materials at speeds up to twelve 100-lb. bags per minute and within an average accuracy of ± 1 to 2 oz. or better. Special scales for flour, sugar, rice, feed and chemicals are available. Low cost automatic proportioning systems and engineering service are Richardson specialties. Write today for details on Richardson Bagging Scales for the Food and Chemical Industries.

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MATERIALS HANDLING BY WEIGHT SINCE 1901

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USEFUL NEW BOOKS & GOVERNMENT PUBLICATIONS

Protecting California's Food

PURE FOOD AND DRUGS IN CALIFORNIA, *by August F. Glaive. Published by National Press, Palo Alto, Calif. 1957. 204 pages, cloth. Price:* $4.50.

Written by the former Chief of the State Food and Drug Laboratory, this interesting volume traces developments in pure food and drug inspection and legislation in California during the first half of the century.

The first section of the book deals with the early problems of the department, from preventing the addition of boric acid to food as a preservative to the enactment of dairy laws.

The second half is concerned with the personal experiences of the author during his 40 years of activity. Here honest and authoritative discussion is given to the problem of fads and quack cures.

Polyethylene After 24 Years

POLYETHYLENE *Edited by A. Renfrew and Phillip Morgan. Published by Iliffe & Sons, Ltd., Dorset House, Stamford St., London SE 1, England. 1957. 642 pages, cloth. Price:* 126s. ($18.50).

Discovered in 1933, polyethylene had little opportunity for development before World War II, but advances made since the war have made it a primary material in the food industry.

The editors of this book cite it as an attempt to compile and critically analyze all the newest data on polyethylene. The information is approached from the viewpoint of the technologist.

Thirty-eight specialists have contributed to the 32 chapters, separated into three sections: Manufacture and properties, Processing Techniques, and Applications.

Booklets & Reports

FOOD FACTS TALK BACK *Published by American Dietetic Assn., Chicago 11. 32 pages. Price:* $.50. Questions and answers on 121 popular misconceptions about food and nutrition.

DESIGNING THE SUPERVISOR'S JOB—AND FILLING IT. *Published by California Personnel Management Assn., Berkeley 4, Calif. 11 pages. Price:* $1. Stenographic brief of address by J. M. Bertotti, Personal Practices Manager, General Electric Co.

FRESH FACTS ABOUT THE FRESH FRUIT AND VEGETABLE INDUSTRY. *Published by United Fresh Fruit and Vegetable Assn., Washington 5, D. C. 24 pages. Price:* $.50. Illustrated data on consumption, distribution, processing, storage, etc.

Multiple-Drive System

—*Continued from page 93*

is thermometer-checked at the slicing station. And, if it varies from the desired 90 to 95F. wrapping range, speed of conveyors is increased or reduced by pressing "high" or "low" pushbuttons at the oven. The power unit then takes over.

. . . **Reduces "cripples."** Product damage is curbed by abolishing the multiple handlings of the former rack-cooling system.

. . . **Cuts floor space requirements.** Racks occupied 720 sq. ft. of space. Now, for the most part, conveyors are ceiling-suspended. Only exceptions are at discharge from oven and in-feed to bun slicer.

. . . **Obviates need for 40 cooling racks.**

. . . **Eliminates wear on floors caused by racks.**

Soft buns and hearth-type ryes are baked in a 45-tray, gas-fired Petersen oven (28½ ft. long) of the double-loop type. This unit has automatic temperature controls, a variable-speed drive (Reeves) and soapstone hearths.

Hourly production ranges from 1,500 2½-in. dia. buns, baked at 425F. for 9 min., to 1,000 5¾-in. rolls given a 17-min. bake at 410F. Rye breads take 45 min. at 475F., and are sprayed with steam during baking to give the bread a hard, shiny surface.

Pans of baked rolls or ryes are manually transferred to a 2x3-ft. gravity-roller conveyor feeding the 825-ft. continuous cooling system.

Here is the route from oven to bun slicer: First, goods are carried along side the oven by a 3x5-ft., 90 1-deg. rod-type conveyor with ⅛-in. rods. Next, they go up on a 3x30-ft. belt section (inclined from 3 to 8½ ft.), equipped with a forced-air cooling system. Latter consists of a 12x16-in. metal duct installed about 9 in. above the belt. An 18-in. blower, powered by a 2½-hp. motor, forces room-temperature air through this duct at 750 cfm.

Internal temperature of product is dropped from 205-210F. (out of oven) to about 170F. as it leaves the cooling belt.

Then two 3x5-ft., 90-deg. rod-type conveyors, with a 12½-ft. rod conveyor between them, loop panned goods around the back of the oven and onto a 43-ft. conveyor on the other side.

Two other 3x5-ft., 90-deg conveyors, with 32 ft. of belting between them, move products around the front of the oven and onto two triple-tiered conveyors with six 90-deg. belts. Total length of tiered conveyors is 540 ft.

From here, baked goods travel successively on three conveyors (60-ft., 90-deg.; 78-ft., 90- deg.; and 6-ft) to the bun slicer.

This machine employs two to five saw-edged-type rotary blades (2-7 in. dia.) that automatically slice the buns as they pass through the unit and into the bagging station or Oliver wrapping machine.

Buns are packed 8 doz. to a bag or machine-wrapped 6, 8, or 12 to a paperboard tray.

An interesting feature of the rod-type cooling conveyors is that they ride on nylon sprockets and over three ¼x1-in. nylon-bearing rails. This eliminates metal-to-metal contact.

Cooling takes about 20 min. for 2½-in. buns, and 32 min. for the 5¾-in. size. A 2-lb rye loaf requires 60-65 min.

The cooling system was 'overdesigned' by 20%, based on normal operating conditions (average temperature and production rate), and it allows 1 sq. ft. of conveyor per dozen rolls.

Conveyor-speed adjustments are made in 2% variations until goods are cooled to desired wrapping temperature. The conveying speed is shown by an electric tachometer mounted on the front of the oven. This instrument is calibrated for a maximum speed of 50 ft. per min., which is indicated as 100%.

A new operator familiarizing himself with the system will generally make two or three adjustments (taking about 20 min.) to get proper cooling. Within a few months, however, he will know the operation so well that only one adjustment will be necessary. —*End*

Recent Inventions

PRODUCTS

Baking Powder Composition Including 30% Sodium Bicarbonate, 20% SAF, 8.7% MCP, 14.2%, Anhydrous Calcium Sulfate, 27.1% Corn Starch.–P. Novitsky, Chicago to General Foods Corp., White Plains, N. Y. No. 2,793,121. May 21, 1957.

Cheese Made With ¼ to 5 lb. of Finely Divided Beef Kidney per 1,000 lb. Milk.–A. B. Erekson, Plymouth, Wis. to Borden Co., New York City. No. 2,793,122. May 21, 1957.

Non-Adhering Dough Glaze Comprising Oils and Fats, Carbohydrate Dispersing Agents, Polycarboxylic Acid Inverting Agent.–C. J. Haas, Philadelphia. No. 2,793,123. May 21, 1957.

Enzyme-Powder Consisting of Edible Tissues Ground Between Tongue and Trachea of Milk-fed Animals Mixed With Equal Weight of Milk Powder, Dried, Pulverized.–M. G. Farnham, to Dairyland Food Laboratories, Inc., Waukesha, Wis. No. 2,794,743. June 4, 1957.

Confectioners' Coating Comprising Vegetable Fat High in Lauric Acid, Cocoa Powder, Sorbic Acid Compound to Prevent Off-Flavors.–F. P. Colten, Roxbury, and H. R. DiPietro, Watertown, Mass. to General Foods Corp., White Plains, N. Y. No. 2,796,348. June 18, 1957.

Icing-Mix Composed of Shortening, Reducing Sugar, Ene-Diol Stabilizer.–B. R. Dunshee and H. M. Keller, St. Paul, Minn. to General Mills, Inc. 2,795,503. June 11, 1957.

EQUIPMENT

Biscuit-Cutter Having at Least One Mobile Support Bearing Cutting Elements, Fixed Underlying Supports, Slide Surfaces–H. T. G. Ooms, Antwerp, Belgium. No. 2,770,203. Sept. 13, 1956.

Canned-Goods Treating Apparatus Comprising Inclined Runway Mounted for Transverse Rocking Movement, Can Moving Means, Treating Liquid Supply Means.–W. de Back, St. Nicolas-Waes, Belgium, and S. A. Mencacci to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,789,795. Apr. 23, 1957.

Juice Extracting Machine Having Rotatable Disks With Means to Support Citrus Half-Fruit, Plungers.–R. Polk, Jr., Tampa, Fla. No. 2,791,171. May 7, 1957.

Dough-Depositing Machine Having Cylinder, Frame, Plunger, Guide.–T. F. Vierow, Brooklyn, N. Y. No. 2,791,188. May 7, 1957.

Paper Cookie-Conveyor Arranged to Convey Products to be Baked Through an Oven on a Disposable Web of Paper-Like Material.–J. A. Wickstrom, San Francisco, to Mother's Cake & Cooky Co., Oakland, Calif. No. 2,791,189. May 7, 1957.

Dough-Making Machine With Continuous Automatic Operation, Combining Endless Horizontal Track, Interconnected Carriages, Mixing Bowls, Dumping Means.–S. Liston, St. Kilda, Victoria, Australia. No. 2,791,405. May 7, 1957.

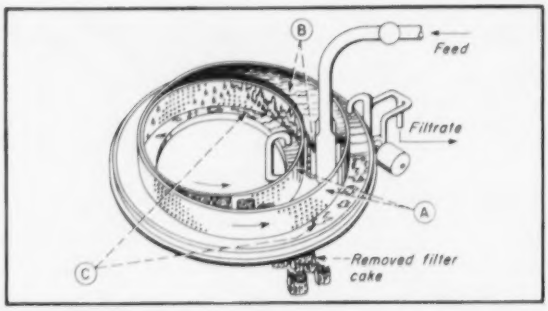
Want more information on any of these recent patents–if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Poultry-Gizzard Skinner Comprising Pair of Oppositely Rotating Grooved Rollers, Water Supply Means.–H. C. Shickel, Bridgewater and E. J. Francis, Harrisonburg, Va. No. 2,791,798. May 14, 1957.

Pie-Filler-Dispenser Comprising Hopper, Cylinder With Variable Stroke Piston, Valved Discharge Tube.–L. S. Camp, Lindale, Ga. No. 2,792,156. May 14, 1957.

Milk-Waste Treating Tank Including Compartment With Air Diffuser Means, Baffles Recirculation Means.–L. B. Griffith, Arlington, Va. No. 2,792,202. May 14, 1957.

Tamale-Making Machine Combining Step-by-Step Conveyor, Food Container Holders, Filling, and Wrapping Means.–J. A. Maickel, to J. Truzzolino, Butte, Mont. No. 2,792,679. May 21, 1957.



Novel Filter Unit Presses Solids From Juice

Internal drum dejuicing press subjects products to successive filtering and pressing. Unit comprises pair of hollow cylinders (A) provided with perforated filter surfaces. Cylinders are mounted eccentrically to provide side walls of a chamber in the space between them. Plates (B) define end, top, and bottom walls of chamber. Filtered liquid is collected in troughs (C) mounted under each cylinder. Rotation of cylinders causes cake to be pressed and then scraped.–R. P. Graham and A. H. Brown, El Cerrito, and W. D. Ramage, Berkeley, Calif. to USDA. No. 2,795,184. June 11, 1957.

Puffing Gun Indexing Mechanism Having Means for Gradually Stopping Rotation of Assembly.–G. Long and S. C. Rustad, Minneapolis, Minn. to General Mills, Inc. No. 2,792,772. May 21, 1957.

Dough-Sheeter Comprising Pair of Reversible Superposed Rolls, Conveyors, Drive Means With Slip Clutch.–G. A. Seewer, Burgdorf, Switzerland. No. 2,792,792. May 21, 1957.

PROCESSES

Subjecting Soya Beans to Subatmospheric Pressure, Elevated Temperature Till Dry, Treating With Hot Nitrous Oxide Under Pressure to Improve Palatability.–R. E. Blatt, Los Angeles. No. 2,789,055. Apr. 16, 1957.

Preparing Colored Potato Chips by Steps of Peeling, Slicing, Washing, Heating, Dyeing, Cooking.–W. B. and G. C. McColm, Long Beach, Calif. No. 2,789,056. Apr. 16, 1957.

Preserving Irish Potatoes With Water Solution of Cinnamate Ions.–A. A. Robbins, W. Covina, Calif. to P. Subkow, Los Angeles. No. 2,790,717. Apr. 30, 1957.

Producing Beer Mash by Mingling Raw Cereals With Warm Water, Adding Enzymes, Heating, Mingling With Main Malt Mash.–A. L. Nugey, Rahway, N. J. to Knit Wear Patents, Inc., Atlanta, Ga. No. 2,790,718. Apr. 30, 1957.

Making Soy Bean Products by Soaking in Dilute Ammonium Salt, Draining, Boiling in Water Till Soft.–C. A. Raymond, Baltimore. No. 2,795,502. June 11, 1957.

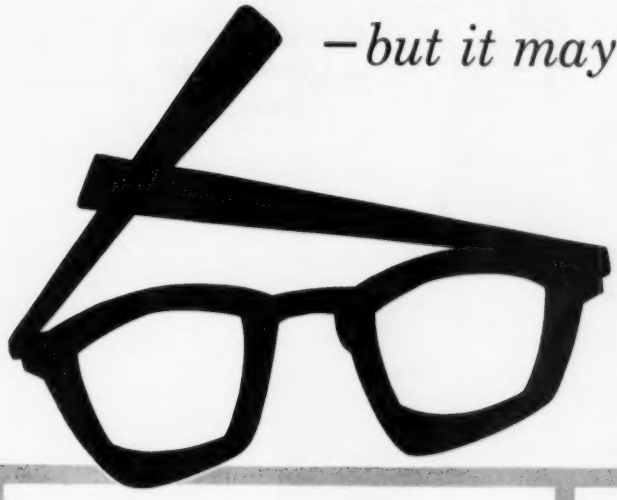
Making Cheese by Stretching Curd, Separating Into Elongated Portions, Inserting Hot Water Into Curd to Effect Reuniting of Strips, Draining, Placing Cheese in Mold.–C. Schwartz, Elkhart Lake to Cheese Machinery, Inc., Sheboygan, Wis. No. 2,794,746. June 4, 1957.

Producing French-Crullers by Mixing Gelatinized and Ungelatinized Starch, Shortening, Egg, and Water-Soluble Protein, Shaping, Frying.–P. G. Grennan, W. Orange, N. J., and Z. Block, Larchmont, and A. H. Goodman, Great Neck, N. Y. to DCA Food Industries, Inc., New York City. No. 2,796,350. June 18, 1957.

Manufacturing Cheddar Cheese by Adding Lactic-Acid Producing Streptococci and *S. Durans* to Pasteurized Milk, Ripening, Adding Rennet,

Nothing new in this

—*but it may pay you to read it!*



It may pay you because some of these long-established advantages of Dicalite filtration — all proved by you and food processing men you know — have perhaps slipped into the back of your mind. A fresh look at them could be of present value, so take two minutes to read on.

Brilliant Clarity The clarity of filtrate obtained with Dicalite filteraids is unsurpassed by any other method. And, since Dicalite filteraids are dependably uniform, lot after lot, you can *depend* on the results of Dicalite filtration.

Sharp Filtration Dicalite filteraids remove *all* unwanted particulates, even down in the bacterial range. All decolorizing clays, activated carbon and the nickel catalyst used in hydrogeneration — every trace is removed.

Complete Stability Dicalite filteraids are both chemically and physically stable . . . they cannot react with the finished product, nor will they add or alter flavor. With the correct grade of Dicalite, there is no color reversion when filtering hydrogenated oils.

Fast Flowrates A Dicalite filtercake is only 10% solid — 90% voids; giving both high throughput and longer filtration cycles before the filters must be cleaned. Saves filter cloths and screens, too.

If you have not completely investigated the advantages of Dicalite in your processing, write for Dicalite Bulletin B-13, which discusses the practical applications of Dicalite filteraids in processing.

DICALITE DEPARTMENT · Great Lakes Carbon Corporation, 612 S. Flower St., Los Angeles 17

These advantages have all been proved by food processors themselves, both in their own laboratory tests and in actual production. They are the reasons why Dicalite filteraids are widely used by leading producers of sugar, syrup, vinegar, wine, beer, cider, soft drinks, jellies, preserves, edible oils and fats, and other food products.

Dependable GLC GREAT LAKES **Dicalite**® DIATOMACEOUS MATERIALS

For more data, circle this page number on card at back →

"Another product safely shipped in Inland 'protection-eered' containers"*

Old Ali Baba never had it so good!

The modern Caravan Products Company of Passaic, New Jersey, producers of TO-TO, a sweet dough base for bakers, doesn't ship by camel. They do, however, provide complete protection for their product, regardless of how it is shipped, with the best shipping container for the job . . . an Inland "protection-eered" pail.

TO-TO contains such ingredients as sugar, shortening, egg solids, flavorings. The baker simply adds flour, yeast and water to make the sweet doughs for his products. Problem was packaging TO-TO so that it would be delivered to bakers fresh, sweet, and positively uncontaminated. Inland solved the problem with a special sanitary pail lining which ships TO-TO as flavor-true and wholesome as the moment it was made.

Lithographing the outside of these sturdy shipping containers in an attractive design and brilliant colors, also solved the problem of brand-name identification, adding distinction and new sales appeal to the product.

If you have a product that requires special protection during shipment, Inland lined containers may be the answer to *your* problems. Learn too, how Inland's complete lithography and design service can *help sell* your product. Write Bob Boecher, Dept. 337G.

**the right container, with the right lining for your product*

INLAND STEEL CONTAINER COMPANY Division of Inland Steel Company · 6532 South Menard Avenue, Chicago 38, Illinois · Plants: Chicago · Jersey City · New Orleans · Cleveland and Greenville, Ohio. *Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.*

← For more data, circle this page number on card at back

Cutting Curd, Heating, Separating Whey, Pressing, Curing.—H. E. Walter, Takoma Park, A. M. Sadler, College Park, J. P. Malkames, Silver Spring, and C. D. Mitchell, Hyattsville, Md. No. 2,796,351. June 18, 1957.

PACKAGING

Food-Package That Comprised Open-Ended Tubular Container with Indented Decorative Design, Soft Plastic Food Body within Container, and Closure—L. Peters, Grand Rapids, Mich. No. 2,770,547. Nov. 13, 1956.

Tea Bag Comprising Container, Tag, String, Adhesive on Tag Adapted to Detachably Secure it to Wall Surface of a Receptacle, Layer of Material Detachably Adhered to Adhesive.—C. E. Nelson, Lake Wohlford, Oakvale, Calif., and E. H. Nelson, Elgin, Ill. No. 2,793,954. May 28, 1957.

Refrigerator Cookie Package Comprising Upper and Lower Sheets Crimped Around Cookies to Form Sealed Compartments, Helical Separating Means.—B. Selmer, Oak Lawn, Ill. No. 2,793,955. May 28, 1957.

Artificial Sausage Casings Carton, Formed of Moisture Resistant Material and Closed by Slots in Upper Flaps.—J. W. Firth to Tee-Pak, Inc., Chicago. No. 2,794,544. June 4, 1957.

Paper Cup With Separate Band of Paper Forming Pockets on Outer Surface Holding Dried Coffee, Cream—R. Olson to K. T. Snow, Oak Park, Ill. No. 2,794,545. June 4, 1957.

Meat-Product Pressure Packing Machine Comprised of a Pair of Jaws Adapted to Securely Hold Gathered End of Prefabricated Container, Ram to Compress Meat Products, Crimping Means.—I. Rabinowitz, Philadelphia. No. 2,795,092. June 11, 1957.

Package for Dough Comprising Fibrous Inner Paper Body With Helical Separation Line, Outer Reinforcing Wrapper With Helical Pealing Edge, End Closures.—W. L. Geist and W. G. Fienup, St. Louis, Mo., H. W. Putnam, Jeffersonville, Ind., R. A. Easter, Minneapolis and R. J. Zoeller, Louisville, Ky. to R-C Can Co., St. Louis. No. 2,793,127. May 21, 1957.

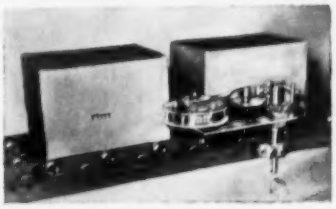
Can-Seam Taping Unit Comprising Means to Apply Tape to Outer and Inner Faces of Side-Seams.—W. Pechy, Belmar, N. J., to American Can Co., New York City. No. 2,795,264. June 11, 1957.

Can-End Stacking Device Employing Magnets to Maintain Parallelism of Ends in Hopper.—W. B. Hommel, Penn Yan to American Can Co., New York City. No. 2,795,340. June 11, 1957.

Sealable Container Composed of Transparent Thermoplastic Material Having Outer Circumferential Bead, Cover Resting on Bead.—W. Kunik, Frankfurt am Main, Germany. No. 2,795,348. June 11, 1957.

Can-Top Sealing Compound Applicating Machine Utilizing Rotating Spindle to Raise Can-Top Into Contact With Sealing Compound Nozzle.—J. Bertorello and B. Cavaliere, Brooklyn, N. Y. No. 2,795,818. June 18, 1957.

KIWI® CODE DATER for SHIPPING CASES



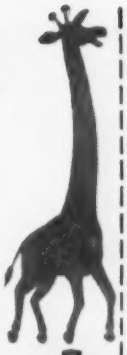
Type built-in on bands, changing the code being accomplished by turning small wheels. No loose type to get lost.

Registered or continuous imprints

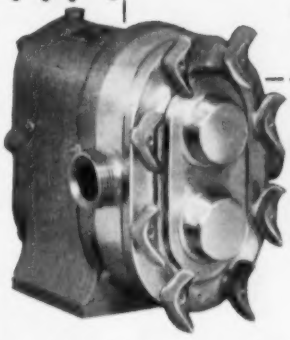
POWER DRIVEN automatic case printers for printing cases in the flat also available.

ECONOMICAL — DURABLE — TROUBLE-FREE

KIWI® CODERS CORPORATION
3804 N Clark St. • Dept. FE • Chicago 13, Illinois



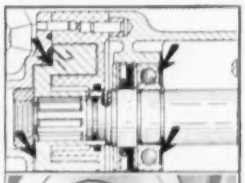
Get Longer Service at Lowest Maintenance... in Your Sanitary Pumping...with



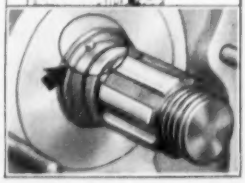
WAUKESHA P.D.* SANITARY PUMPS

Both metallurgically and mechanically, Waukesha P.D. Sanitary Pumps are designed specifically to meet the rigid demands of Sanitary regulations in pumping food and dairy products under virtually all conditions of head pressures and temperatures. The Waukesha Metals used are the result of over a quarter century of pioneering completely sanitary, easily cleaned sanitary pumps. And, mechanically, there are at least *eighteen* reasons for the longer service and lowest maintenance already proved in the food, beverage and dairy industries.

These "reasons" include such important factors as positive sealing with Twin O-Rings, better load-balance between shafts and heavy duty bearings, larger, stronger shafts, more and huskier splines — for greater rigidity, less wear — and newly designed twin blade impellers for better distribution of the load factor at all speeds and pressures. There are many more new features you'll want to know about.



This drawing shows the close position between the heavy duty ball bearings and the corrosion-resistant impellers — for reduced shaft-slap and wear.



Larger diameter shafts, more and larger splines, plus a new stainless steel shaft seal with positioning pin, assure greater rigidity to impellers and longer service.

This new WAUKESHA 1957 Catalog gives you the whole story. Write for your copy, telling us what product you handle . . . Just a postcard will do.

*Positive Displacement

ONLY Waukesha gives you a quarter century's experience and reliability

Waukesha FOUNDRY COMPANY
DEPT. A-8, WAUKESHA, WISCONSIN

"Our greatest challenge . . . the development of men"

Ralph Cordiner, President, General Electric Company

"Few expenditures we can make are more important than those for education. A well-educated person produces more and consumes more, makes wiser decisions at the polls, mounts a stronger defense against aggression, and is better able to perform the grave responsibilities of American citizenship.

"Freedom needs educated people. So do business and industry. I earnestly ask you to support the college or university of your choice in its planning for expansion and a stronger faculty. The returns will be greater than you think."

PUBLIC SERVICE ADVERTISING COUNCIL

If you want more information on the problems faced by higher education, write to: Council For Financial Aid To Education, Inc., 6 E. 45th Street, New York 17, New York

HIGHER EDUCATION KEEP IT BRIGHT

Sponsored as a public service, in cooperation with the Council for Financial Aid to Education

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executives, management, technical, selling, office, skilled, manual, etc.

NATIONAL COVERAGE

Positions Vacant
Positions Wanted
Part Time Work

Civil Service Opportunities
Selling Opportunities Wanted
Selling Opportunities Offered

Employment Agencies
Employment Services
Labor Bureaus

DISPLAYED ——RATES—— **UNDISPLAYED**

The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

$1.50 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Positions Wanted—The rate is one-half of the above, payable in advance.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS or Inquiries to Classified Advertising Division of FOOD ENGINEERING, P. O. Box 12, N. Y. 36, N. Y.
September issue closes August 29th.

FOOD TECHNOLOGIST

Central Quality Control Department has openings for experienced bio-chemists and food technologists. Advancement opportunities in plant or staff quality control and production supervisory positions. Salary commensurate with experience. Send complete resume to:

Personnel Department
THE WELCH GRAPE JUICE CO., INC.
Westfield, New York

PACKAGING MACHINE DISTRIBUTORS

Cheslam Division of St. Regis Paper Co. has choice territories open for the distribution of the Griswold 5-in-1 Packaging Machine. Intensive advertising and full Dealer support. The Vac-u-Seal will vacuum pack, gas pack, combination vacuum and gas pack, heat seal, and take unlimited pouch sizes. Small capital investment—unlimited potential. Reply to: 684 Nepperhan Avenue, Yonkers 2, N. Y.

To Employers Who Advertise for Men:

The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered.

When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. Others do not receive the slightest indication that their letters have even been received, much less given any consideration. These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bona fide.

We can guarantee that *Every Advertisement Printed Is Duly Authorized.* Now won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked, say, "Position filled, thank you." If you don't care to reveal your identity, mail them in plain envelopes.

We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements.

Classified Advertising Division
McGRAW-HILL PUBLISHING COMPANY
"Put Yourself in the Place of the Other Fellow"

WE NEED

FOOD TECHNOLOGISTS and FOOD CANNNING CANDIDATES
—junior to top-level

Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
220 S. State St., Chicago 4, Ill.
HArrison 7-8600

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Engineer—Grad. mechanical preferred. Ind. Refrigeration exp. desirable. For position as district engineer for large midwest frozen food processor. Responsibility includes all phases engineering in three plants. If interested send application stating qualification, background, experience, salary requirements, references. P-5696, Food Engineering.

Chemist—Food Technologist: For production management, laboratory and products control. Knowledge of meats, meat products, spices, seasonings and additives helpful. Good opportunity for industrious man. Salary commensurate with ability. Send resume to First Spice Mixing Co., Inc., 19 Vestry St. N. Y. 13, N. Y.

Cereal Production Supervisor. Prominent Dog Food manufacturer wants experienced man for dry dog food dept. Broad experience with cereal, corn flakes, pellets and dry dog food helpful. State experience, salary and enclose recent snapshot. S. E. Mighton Co., Bedford, Ohio.

EMPLOYMENT SERVICE

Salaried Personnel. $5,000-$30,000. This confidential service established 1927 is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F., P. O. Box 674, Manchester, Vermont.

POSITIONS WANTED

Mechanical Engineer over 20 years diversified industrial experience, 10 years in management. Seeks position as packaging engineer, or manager of packaging division, in food, confectionery, or related industry. PW-5727, Food Engineering.

Production & Research Chemist, with extensive experience in manufacture, development, control, of a wide line of confectionery and chocolate products, desserts, cereal products, and other foods, as well as laboratory direction, desires a position of responsibility. PW-5681, Food Engineering.

Food Technologist desires position in sales and technical service to baking, confectionery, ice cream, etc. industries in New England area. Reply PW-5726, Food Engineering.

Food Technologist—B. S. '50. Background in Sales Engineering and Analytical Chemistry. Desires position with progressive company. PW-5740, Food Engineering.

Salesman experienced industrial food sales, desires position selling to manufacturers. Will travel or relocate. Presently selling Metropolitan New York Area. Age 35. Married. College. PW-5748, Food Engineering.

Are you serious about your future?

Consider Industrial Enzymes

If you are looking for a long-term association with a company that is well established, growing rapidly but soundly, you will be interested in the career opportunities in field development at Rohm & Haas.

The man we need should hold a Ph.D., or should have B.S. or M.S. with some industrial experience. His training should be in biochemistry, bacteriology or food technology. He may or may not have had field experience. He will be a member of a group of technically trained men. He will be calling upon users and prospective users of industrial enzymes with particular emphasis on the food industry.

If you have the technical qualifications and an aptitude for getting along well with people, write

C. E. Denoon, Jr.
Rohm & Haas Company
Special Products Department
Washington Square,
Philadelphia 5, Pa.

Send complete resume of training and experience. All replies will be acknowledged and treated in confidence.

EQUIPMENT SALES EXECUTIVE

TO MANAGE NEW SALES DIVISION

Chicago Manufacturer, founded in 1896, has opened a new division producing advance design SIZE REDUCTION equipment used in the meat and food processing, chemical and pharmaceutical industries.

We require the services of an equipment sales executive preferably with a chemical engineering background, who is capable of selling to top level production executives, and demonstrating the application to their particular manufacturing processes. Some custom engineering of machines for special application would be required. Mature man with practical processing experience preferred.

Development of a nation-wide sales organization is involved. Salary will be commensurate with the qualifications and with room for advancement in accordance with results achieved.

The Cog Corporation
division of Motiograph, Inc.
4441 W. Lake St.
Chicago 24, Ill.

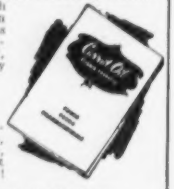
WHERE TO

- **STORE** Frozen Foods
- **BUY** Ingredients, Equipment, Parts, Services

CARROT OIL makes food golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A activity.

Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A activity of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.



SEND FOR BOOKLET

New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals, important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitney, Ind.

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

SEARCHLIGHT SECTION

(Classified Advertising)

SPECIAL SERVICE

Laboratory Equipment Repair Co., 1810 W. Ogden, Chgo 12, Ill. AO-Beckman-B&L-Coleman-Klett-Leitz.

Rebuild those leaking valves!! Sanitary valves rebuilt for a fraction of the cost of a new valve. Prices submitted on request. Stuart W. Johnson & Co., 611 Main Street, Lake Geneva, Wis.

Instrument Repair. Temperature regulators, mercurial indicating thermometers and recording thermometers of all makes repaired. Complete satisfaction guaranteed. Stuart W. Johnson & Co., 611 Main Street, Lake Geneva, Wis.

WANTED

ANYTHING within reason that is wanted in the field serviced by Food Engineering, an be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

SEARCHLIGHT SECTION

(Classified Advertising)

BUSINESS OPPORTUNITIES — EQUIPMENT - USED or RESALE

UNDISPLAYED ——***RATES***—— ***DISPLAYED***

$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line. BOX NUMBERS count as one line additional in undisplayed ads.

DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

The advertising rate is $13.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request. AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW ADS or Inquiries to Classified Advertising Division of Food Engineering, P. O. Box 12, N. Y. 36, N. Y. September issue closes August 29th.

The outstanding canning plant in the Ozark area

EXCELLENT CONDITION

Fully equipped to handle:

Spinach, turnips, mustard greens, kale, collards, green beans, irish and sweet potatoes, tomatoes, green peas, berries, and complete dry line.

Ready for use immediately.

Adequate supply of raw materials and labor available for the Fall pack. Address all inquiries to

THE CITY NATIONAL BANK

Box 799 **Fort Smith, Arkansas**

USED

VACREATOR WANTED

Capacity 10 to 20,000 lbs. per hour.

B. DESAULNIERS
1504 Davidson St.
Montreal, Que., Can.

FOR SALE

Bottle Washer for gallon jugs, cap. 600 per hr., 15'6" Long; will also handle half-gallons.

International 24-spout stainless filler.

Resina automatic screwcapper.

4—500-gal. stainless tanks.

Karl Kiefer 16-spout rotary filler, vacuum type.

Pneumatic Scale 12-spout semi-automatic filler.

Can be purchased separately. Details upon request. Inspection invited. Fair market selling prices for first-class equipment.

FS-5795—Food Engineering
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

Wanted: FLAKING MILL

Will buy used flaking mill, rotary grain cooker, cereal dryer and rotery oven suitable for toasting flakes for cereals.

S. E. MIGHTON CO.,
Bedford, Ohio.

BOILERS

HI-PRESSURE
Complete stock from 10-2,000 h.p.
Nation's largest inventory, New & Used
WABASH POWER EQUIPMENT
31 E. CONGRESS, CHICAGO 5, HA 7-4855

TANK TRUCKS FOR SALE

Six—1500/gal. Farm Pick up Tanks
Heil Tanks on Ford Trucks
Prices range from $3800 to $10,000 for complete unit.

Whatcom County Dairymen's Association
Box 157 Bellingham, Wash.

GLASS TANKS

2—4200-gal. each one-piece A. O. Smith glass-lined tanks, immediate delivery, f.o.b. Cincinnati.

FS-5797—Food Engineering
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

STAINLESS CENTRIFUGAL

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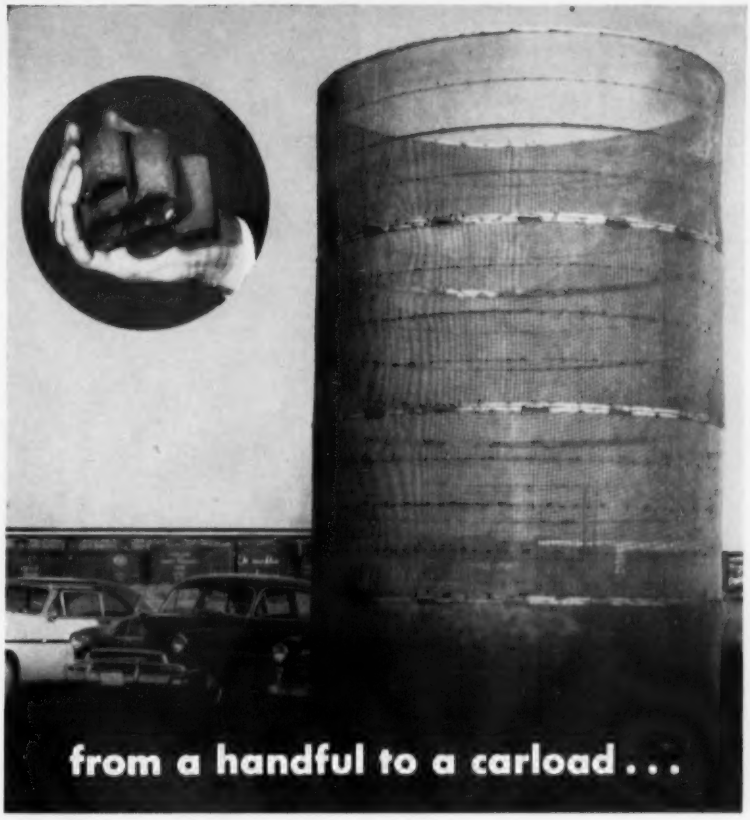

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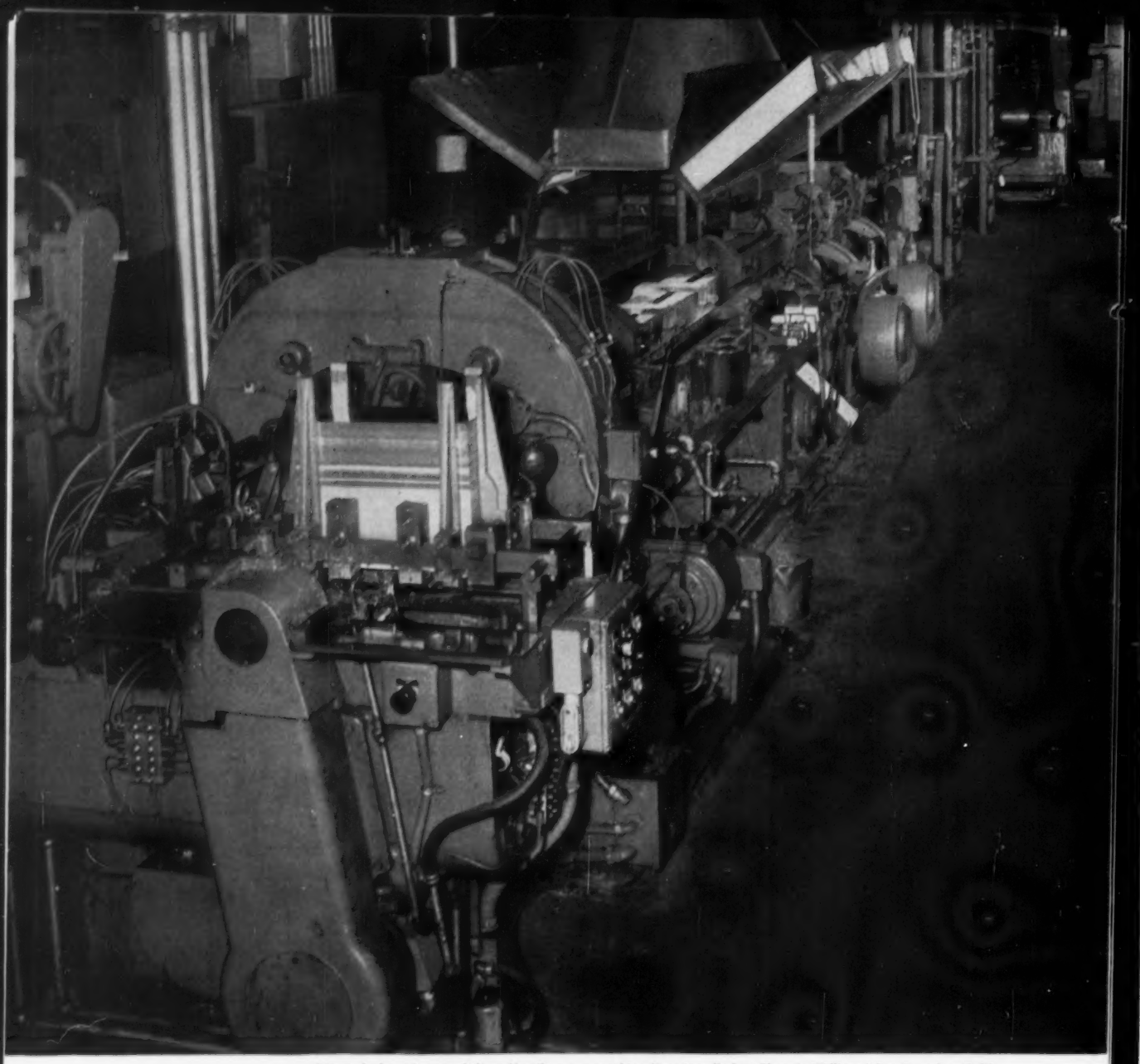

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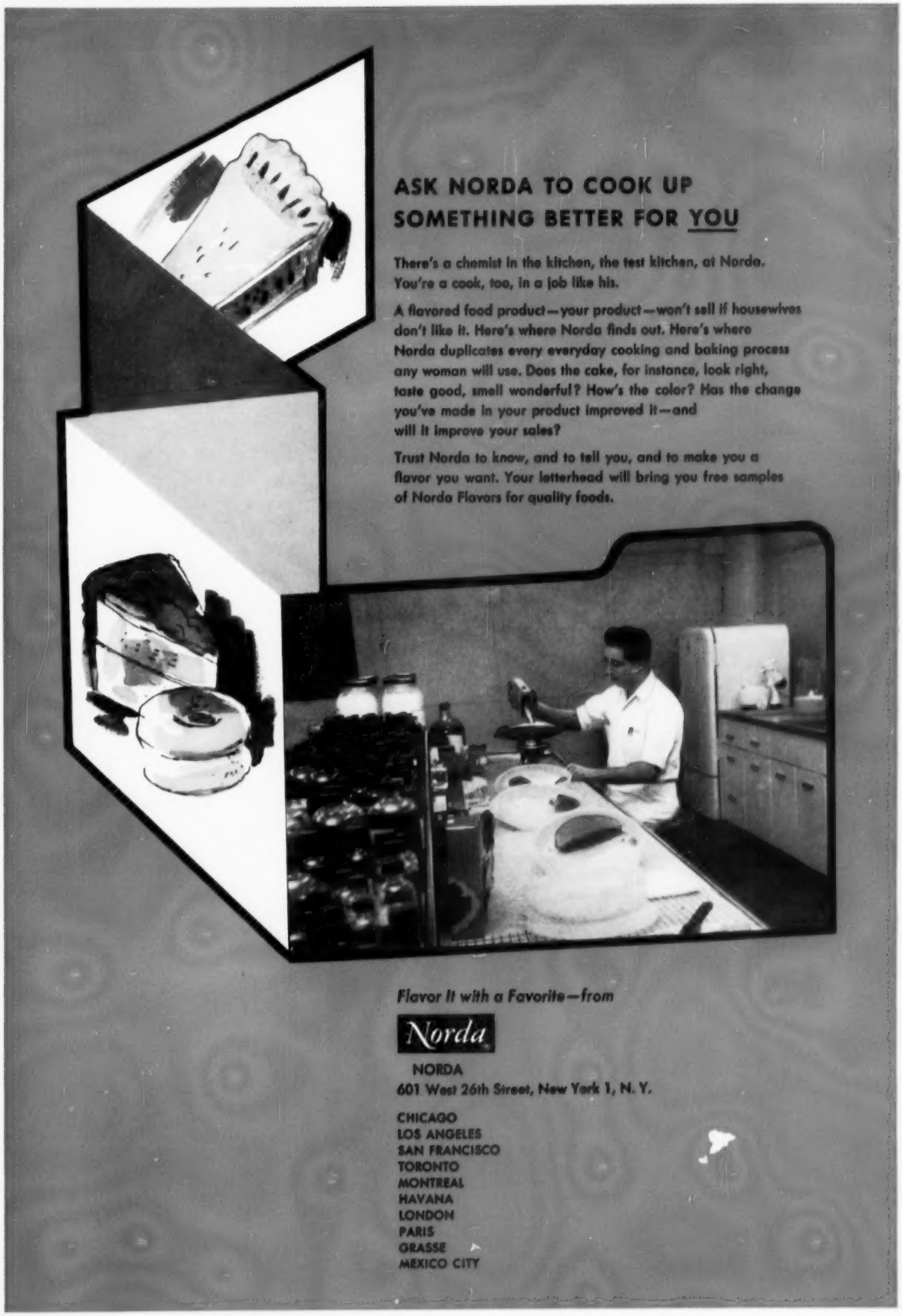
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PROVERB PRATTLE

"Don't put the cart before the horse"

First found in Whittington's "Vulgarity" written in 1520: "That teacher setteth the cart before the horse that preferreth imitation before precepts." Shakespeare, in 1605, made use of the phrase in *King Lear* and again in *King Richard III.*

• It's the flavor quality in the finished product that counts.

"Sealva Flavors"

(hermetically sealed flavors in dry powder form)

True fruit or imitation, Alva Flavors processed in Sealva form, represent the highest quality and the most faithful reproduction of taste values, which carry through *and last and last*—in all dry packaged food products.

Samples, technical information and use recommendations will be sent at your request.

van Ameringen-Haebler, Inc.

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Alva FLAVORS